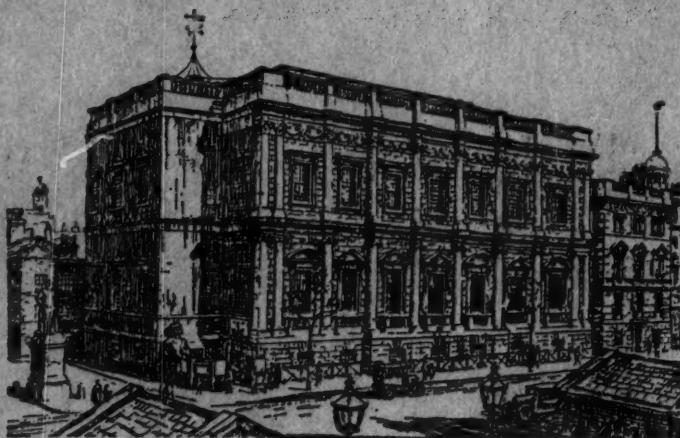


MAY 1946



JOURNAL



Royal United Service Institution

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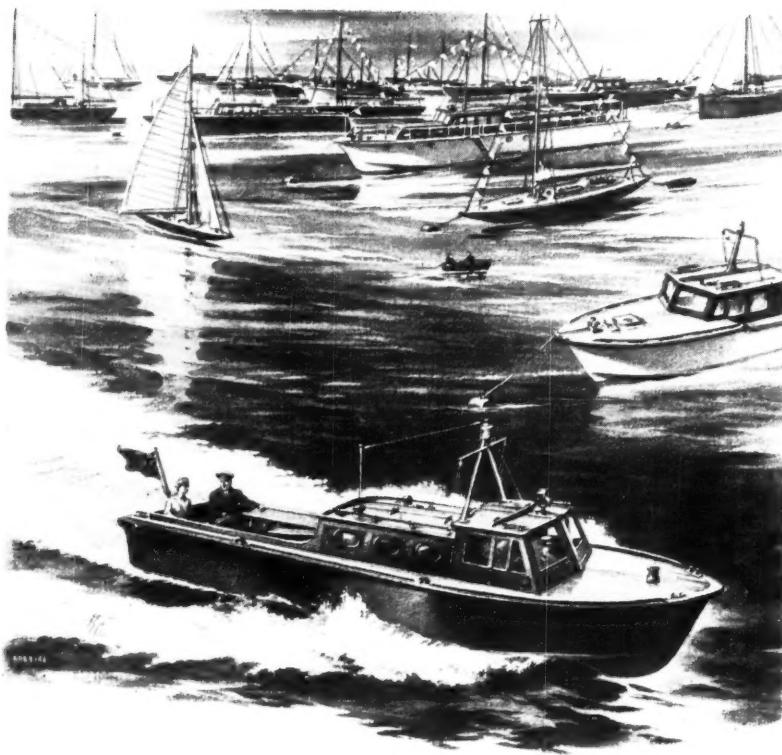
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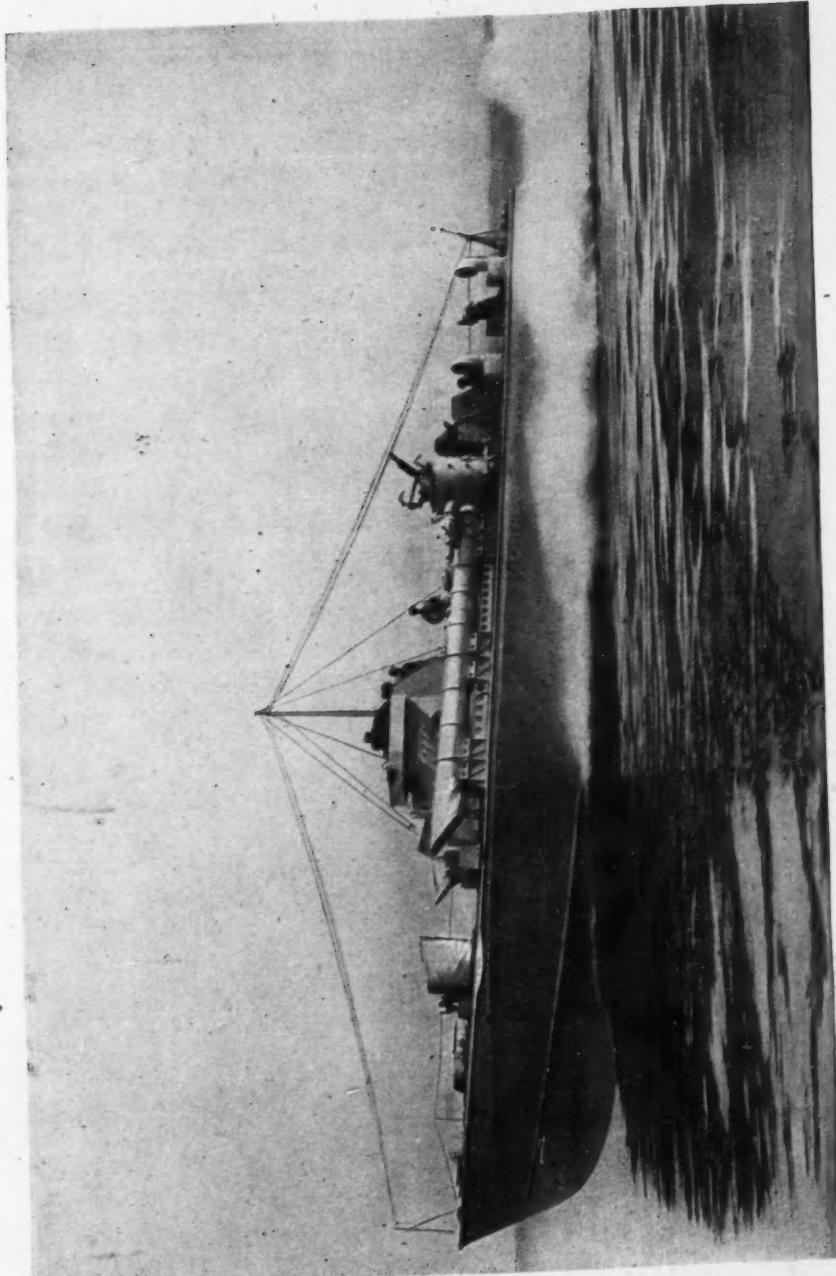


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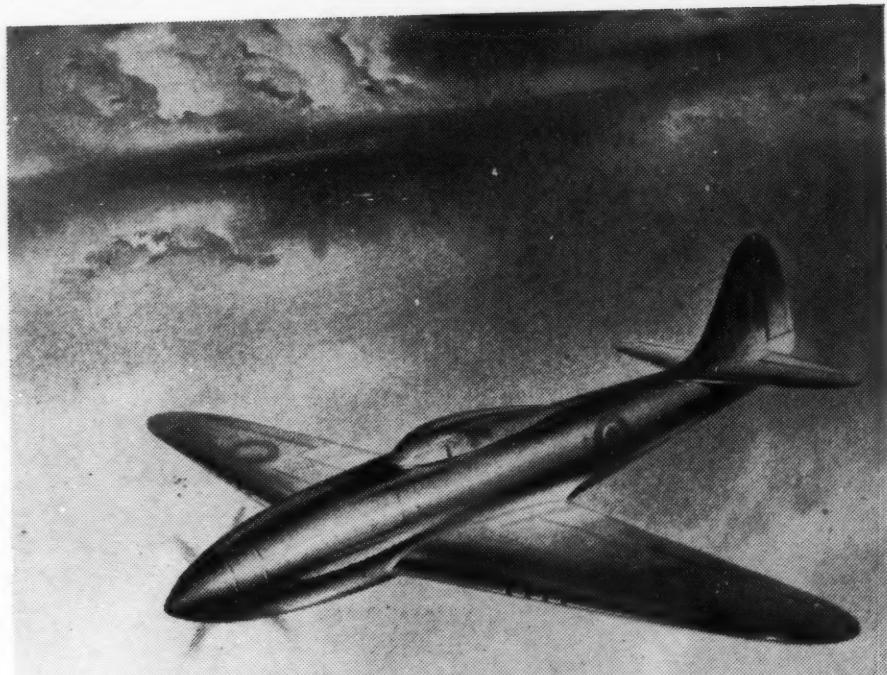


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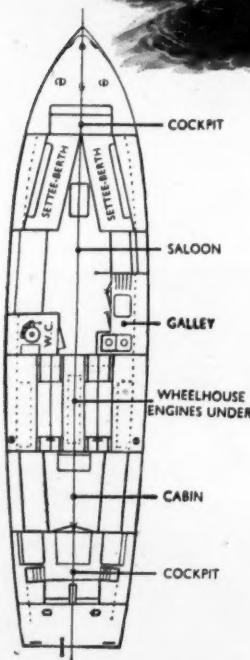


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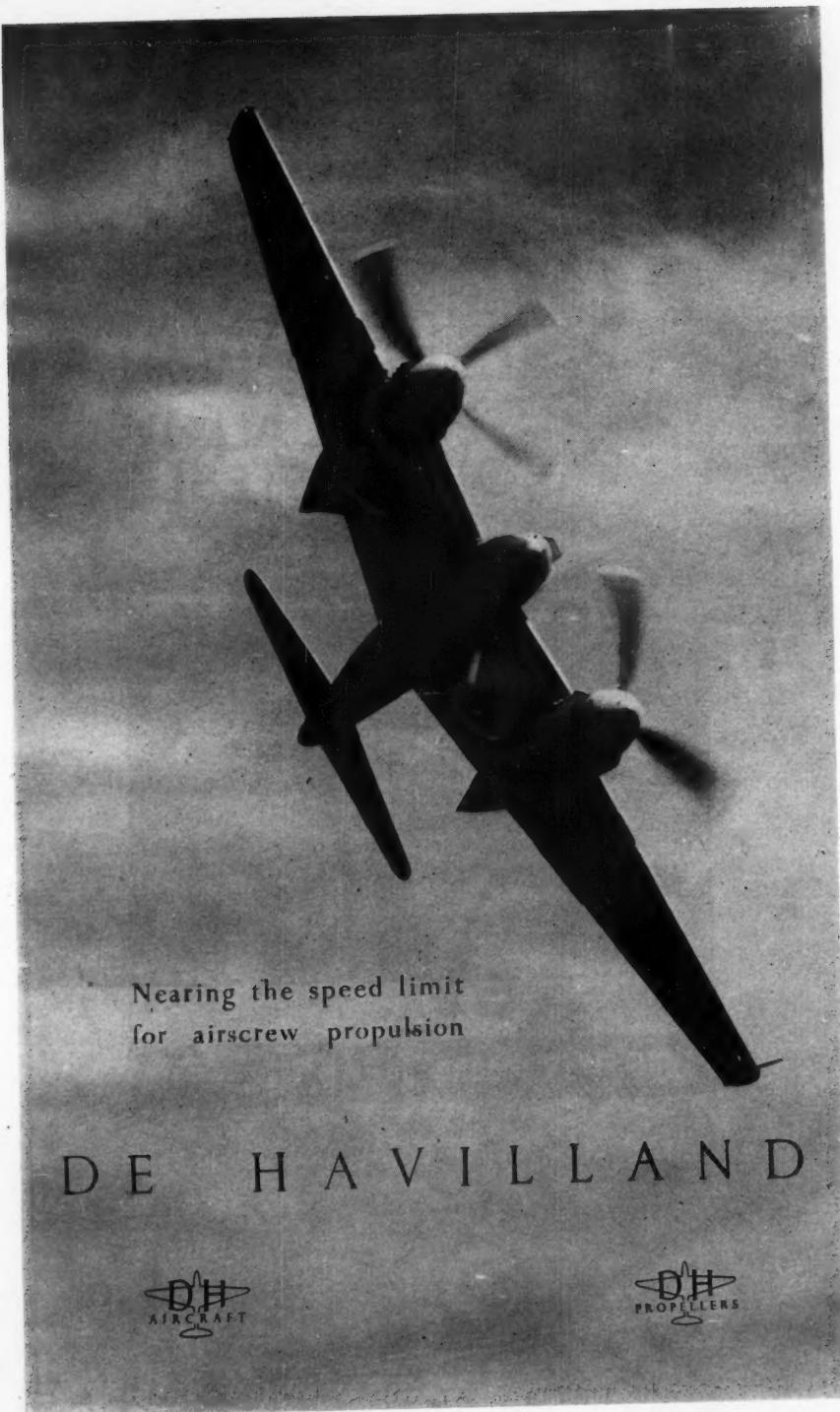
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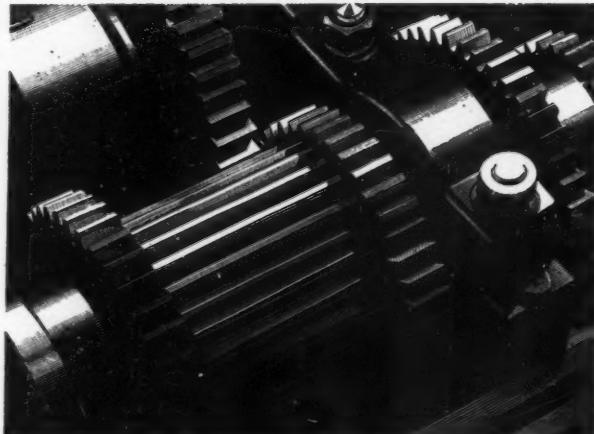


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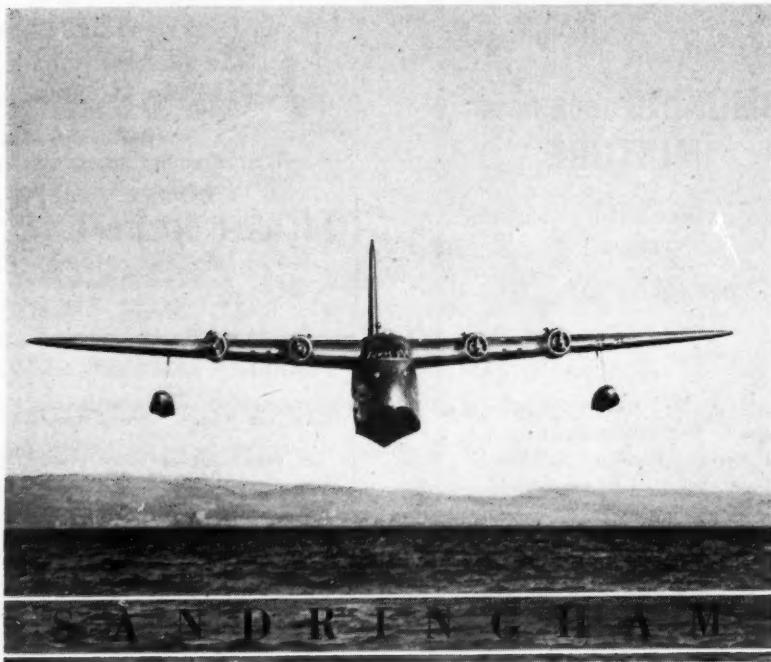
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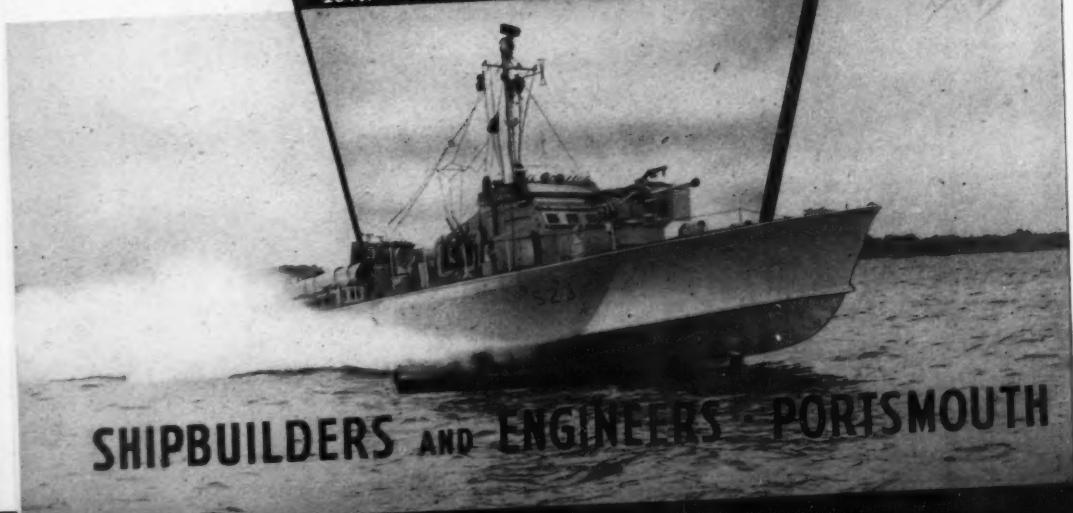
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Telephone No : Whitehall 5854.

Telegraphic Address : "Russatus, Parl, London."

Vol. XCI.

MAY, 1946.

No. 562.

Advertising Manager :

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General Sir William Slim, G.B.E., K.C.B., D.S.O., M.C., has accepted the invitation of the Council to become an Ex-Officio Member on taking up the appointment of Commandant of the Imperial Defence College.

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 Lieut.-Colonel C. E. C. Burton, Royal Artillery.
 Major G. T. A. Strong, M.C., Royal Tank Regiment.
 Major W. P. A. Shuttleworth, The Royal Norfolk Regiment.
 Lieut.-Colonel D. N. Ascoli, The Royal Berkshire Regiment.
 Brigadier W. D. A. Lentaigne, C.B.E., D.S.O., I.A.
 Lieutenant P. T. O'Kelly, R.A.S.C.
 Brigadier A. D. Ward, C.B., C.B.E., D.S.O., The King's Regiment.
 Lieut.-Colonel N. J. Gell, M.C., Royal Engineers.
 Lieutenant W. Wilson, R.A.P.C.
 Lieut.-Colonel W. D. Ponting, The Royal Scots Fusiliers.
 Captain P. A. N. Lindley, The Buffs.
 Lieut.-Colonel C. C. Macdowell, C.M.G., D.S.O., late R.A. and 3rd London Yeomanry.

ROYAL AIR FORCE

Pilot Officer S. Hallam, R.A.F.
 Squadron Leader G. J. Chandler, R.A.F.
 Group Captain G. N. Hancock, C.B.E., R.A.F.
 Squadron Leader F. H. P. Lewer, R.A.F.
 Group Captain J. D. T. Revell, R.A.F.
 Group Captain D. L. Amlot, D.F.C., A.F.C., R.A.F.
 Group Captain S. J. Marchbank, D.F.C., R.A.F.
 Wing Commander A. W. Daniels, R.A.F.
 Wing Commander W. F. Lamb, O.B.E., R.A.F.
 Wing Commander B. A. S. Lewin, R.A.F.
 Group Captain J. H. S. Richards, R.A.F.
 Flight Lieutenant P. G. K. Williamson, D.F.C., R.A.F.
 Air Commodore A. G. Adnams, R.A.F.
 Wing Commander R. K. Cassels, D.F.C., A.F.C., R.A.F.
 Squadron Leader H. Ellul, R.A.F.
 Wing Commander R. V. L. Pattison, D.S.O., D.F.C., R.A.F.
 Wing Commander R. W. Pye, R.A.F.
 Group Captain P. J. Sanders, D.F.C., R.A.F.
 Flight Lieutenant T. N. Critchlow, R.A.F.
 Squadron Leader J. F. Hatton, R.A.F.
 Squadron Leader E. B. Sismore, D.S.O., D.F.C., R.A.F.
 Wing Commander R. J. M. Bangay, D.F.C., R.A.F.
 Wing Commander A. H. C. Boxer, D.S.O., D.F.C., R.A.F.
 Wing Commander G. W. Petre, D.F.C., A.F.C., R.A.F.
 Flight Lieutenant A. Dakin, R.A.F.V.R.
 Wing Commander G. A. Richmond, R.A.F.
 Wing Commander M. Wyatt, D.F.C., R.A.F.
 Squadron Leader N. W. Maskell, R.A.F.
 Flying Officer A. C. Clinton, R.A.F. Reserve of Officers.

Flight Lieutenant K. W. T. Pugh, A.F.C., R.A.F.
 Squadron Leader N. M. W. Harris, R.A.F.
 Squadron Leader J. F. Houchin, R.A.F.
 Squadron Leader H. B. Jenkins, R.A.F.V.R.
 Group Captain R. S. Ryan, R.A.F.
 Squadron Leader F. A. Willan, D.F.C.
 Wing Commander J. H. Player, D.S.O., D.F.C., R.A.F.
 Group Captain C. E. Kay, M.B.E., D.F.C., R.N.Z.A.F.
 Flight Lieutenant John Wall, R.A.F.
 Wing Commander S. G. Baggott, D.F.C., R.A.F.
 Flying Officer J. H. S. Molineux, R.A.F.V.R.
 Squadron Leader W. G. Weston, M.B., Ch.B., R.A.F.
 Group Captain R. G. Slade, R.A.F.
 Squadron Leader H. E. White, D.F.C., R.A.F.

COVENANTED SUBSCRIPTIONS

The Council hope that many more Members will support the Scheme for Covenanted Subscriptions, details of which have been circulated to all Members.

This materially assists the Institution because it enables Income Tax at the full current rate to be reclaimed on each subscription.

To date, 535 Annual and 89 Life Members have signed the necessary Deeds.

Any Member who has not received his copy of the Scheme or who requires new forms is requested to communicate with the Secretary.

R.U.S.I. LIAISON OFFICERS

With the object of making the facilities afforded by membership of the Institution better known to the Services, the Council have invited the principal Commands at Home and Overseas to nominate Liaison Officers.

Liaison Officers have been provided with Particulars of the Institution and forms to enable them to enrol members without further formality.

A list of the Liaison Officers already nominated appeared in the Secretary's Notes for February, 1946. The following additions or changes have occurred since that date:—

Army

Lieut.-Colonel H. R. R. Conder	...	...	...	...	...	Northern Command.
Lieut.-Colonel C. I. H. Dunbar, D.S.O.	...	...	...	...	...	Central Mediterranean Forces.
Brigadier R. H. Hewetson, C.B.E., D.S.O.	...	...	...	...	...	British Troops in Austria.
Lieut.-General Sir Francis Tuker, K.C.I.E., C.B., D.S.O., O.B.E.	...	...	...	...	...	India Command.
Lieut.-Colonel P. de C. Jones	...	...	...	...	...	Allied Land Forces, South-East Asia.

R.A.F.

Wing Commander J. H. Iremonger, D.F.C.	...	...	...	...	...	Fighter Command.
Group Captain R. E. Burns, D.F.C.	...	...	...	...	...	Coastal Command.
Wing Commander R. H. A. Coombs	...	...	...	...	...	Bomber Command.
Wing Commander Gill-Murray, D.S.O.	...	...	...	...	...	Technical Training Command.
Air Vice-Marshal E. J. Kingston-McCloughry, C.B.E., D.S.O., D.F.C., R.A.F.	...	...	...	...	...	India Command.

TRENCH GASCOIGNE PRIZE ESSAY COMPETITION, 1946

Subject

The following subject has been selected for the Trench Gascoigne Prize Essay Competition (Three Services) 1946:—

“ How can the lessons learnt from the development of the Services in organization and technique since 1939 be applied most efficiently to the solution of Imperial Defence problems ? ”

A copy of the rules can be supplied on application to the Secretary.

JOURNAL

REQUEST FOR BACK NUMBERS.—The Editor would be grateful for any copies of the Journal for February, May and November, 1939; February, May and August, 1941; and November and August, 1942, which Members may have finished with, in order to meet applications for these numbers.

CHANGES OF ADDRESS

Members are particularly requested to notify any change of address which will affect the dispatch of the Journals.

MUSEUM

RE-OPENING OF CRYPT.—The Crypt on the ground floor of the Museum is now fully re-opened and contains a number of new and up-to-date exhibits including the diorama of the Normandy Landing generously presented by Mr. Otto Gottstein. This depicts D-Day on the left flank of the British landing.

RESTORATION OF THE BANQUETING HALL.—The Banqueting Hall is closed to enable the Ministry of Works to replace the Rubens ceiling. This will take some months.

WAR RELICS.—Members and others interested in the R.U.S. Museum are requested to keep a look out for war relics. Considerations of space preclude the acceptance of anything except small articles of particular historic interest. Personal relics of special distinction will be very acceptable.

ADDITIONS

Brass head of Hitler, which was found enshrined in the Gauhaus at Hamburg. Given by 8th K.R.I. Hussars.

Full Dress Uniform of a Colonel of the R.H.A. Given by Captain R. L. B. Cunliffe, R.N. Naval General Service Medal with clasp for the Battle of Algiers, 27th August, 1816. Given by Captain R. Hughes, D.S.C., R.N.

Collection of Regimental Badges of Canadian Units who served overseas during the War 1939-45. Given by Canadian Military Headquarters.

German Rear-Admiral's Flag, salved from Von Reuter's flagship, "Emden," sunk at Scapa Flow on 22nd June, 1919. Given by Captain W. B. Hynes, R.N.

Models of the Avenger II, Albacore IV, Firefly III and Fulmar VIII aircraft. Given by the Admiralty.

Diorama of the Allied Armies landing in Normandy, "D" Day, 6th June, 1944. Given by Otto Gottstein, Esq.

Model of a "Stirling" aircraft. Given by Short Bros.

Model of a "Lancaster" aircraft. Given by A. V. Roe & Co.

Full Dress Coat, shoulder-belt and plate of the Writtle Loyal Volunteers, c. 1806.

Rank and File Field Dress head-dress of the Queen's Westminster Rifles, 1908-1914. Given by Captain R. J. Blogg, A.I.A.S.

Models of the "Tempest" and "Typhoon" aircraft. Lent by the Hawker Aircraft Co. Raised Plan Model of the Pre-fabricated Harbour "Mulberry." Given by the War Office.

Models of L.S.T. Pier used in the "Mulberry" Harbour. (a) Pierhead Units (b) Flexible bridge span and shore-end unit. Given by the War Office.

Model of a Breakwater Unit (Phoenix) of the "Mulberry" Harbour. Given by the War Office.

Photographic Panorama of the "Mulberry" Harbour. Given by the War Office.



Photograph by Charles E. Brown

THE LAST OF A LONG LINE OF FAMOUS FIGHTERS
SPITFIRES MK XXI AND XXII

By courtesy of Vickers-Armstrongs Ltd
(Aircraft Section)

THE JOURNAL

of the

Royal United Service Institution

Vol. XCI.

MAY, 1946.

No. 562.

[Authors alone are responsible for the contents of their respective Papers.
All communications, except those for perusal by the Editor only, should
be addressed to the Secretary, Royal United Service Institution.]

THE AIR DEFENCE OF GREAT BRITAIN

By AIR MARSHAL SIR RODERIC HILL, K.C.B., M.C., A.F.C.

On Wednesday, 30th January, 1946, at 3 p.m.

LIEUTENANT-GENERAL SIR CHARLES LOYD, K.C.B., D.S.O., M.C., in the Chair.

THE CHAIRMAN: It would appear to be unnecessary to introduce Sir Roderic Hill who is so well known to most of you. He has, as you are aware, in the years 1943 to 1945 commanded a Fighter Group, Air Defence of Great Britain, and Fighter Command. He is now Air Member for Training, so there can be very few, if any, better qualified than he to talk to you on this subject.

LECTURE

BEFORE starting my talk this afternoon on the Air Defence of Great Britain, I wish to acknowledge the courtesy of the Air Ministry in according me the necessary permission. The ideas contained in my talk are based on my personal experiences and opinions, and do not necessarily reflect the official trend of thought, nor need they be associated with modern policy in official circles. I must also make it clear that when I am talking about the contribution to air defence made by the Royal Air Force, I am in no sense under-estimating the part played by the other Services which, under air attack, buttressed the air defence so firmly. After all, nearly all the guns used for anti-aircraft work belonged to an Army command, and the Royal Navy operated in manifold and diverse ways, lending the R.A.F. pilots and equipment and foregoing much needed priority when the Air was hard pressed.

EFFECT OF DISCOVERY OF FLYING

On the way to my office in the mornings I frequently meditate on what an inconvenient invention flying has so far proved. The conquest of the air came at a time when war clouds were gathering and, as was inevitable, it was not long before this nascent art was harnessed to the war machine. As a result, nine out of every ten aircraft built so far have been used for war purposes.

From the military point of view, the advent of flying was probably the biggest single innovation since the first use of gunpowder six hundred years before. It came as a severe jolt to the complacency of contemporary thought. I am reminded of the old Spanish proverb quoted by Sancho Panza and alluded to by Mr. Wimperis in his book called *Aviation*, "To her own hurt grew the wings of the ant." Just

as happened with its predecessor gunpowder, the implications of flying were forced upon, rather than eagerly accepted by, those inured to the time-honoured canons of warfare.

GERMAN DAYLIGHT ATTACKS ON LONDON, 1917

During the War of 1914-1918, whatever forebodings haunted the higher Naval and General Staffs, and in spite of the unwelcome attentions of the German naval airships under cover of darkness, the people of this country slumbered on; a little uneasily perhaps, but with a fair illusion of security against air attack. One fine June day in 1917, the morning of 13th June, they were awoken with a shock which sharply marked the end of an era.

The citizens of London became aware of a resonant droning in the high Summer haze and some of them vaguely wondered why our machines were so active. A few minutes later, the whine and crash of bombs were heard—small bombs it is true, but 162 men, women and children crowding the streets with innocent curiosity were violently and sensationally killed. The bombs from fourteen Goths of No. 3 Bombing Squadron stationed at St. Denis Westrem and led by Hauptmann Brandenburg caused more casualties in this raid than all those inflicted on London by the Zeppelin attacks up to that time.

Lieutenant-General Jan Smuts, since become the renowned Field-Marshal, then a recently appointed member of the British War Cabinet, was in his room at the Savoy Hotel. He saw the German Goths out of his window and when the raid was over he visited the scenes of what we have since euphemistically come to describe as "incidents." He was deeply concerned not so much by the sights that met his eyes, as by what his imagination conjured up: events that would assuredly come to pass now that their possibility had been demonstrated. He saw the writing on the walls of London.

That afternoon the Cabinet met. Frequent and anxious discussions ensued. A fortnight later, on 2nd July, a proposal to double the size of the air service was approved. Meanwhile, events moved fast. On Saturday, 7th July, a second raid on London took place, killing 54 and injuring 190. This, however, was not the most serious aspect of the case. The main cause for alarm was the futility of our unorganized defence. Although 78 of our aircraft took off to repel the raid, only one Gotha was shot down and the fire of our anti-aircraft guns failed to break up the enemy formation. Considering the technique of those days, the bombing was remarkably good. This was mainly because the Goths were not effectively opposed. In his report the German leader Brandenburg wrote: "Our aircraft circled round and dropped their bombs without hurry or trouble."

The country as a whole was indignant and mortified, and these raids were the means of bringing home to our people that, for the time being, the enemy possessed offensive weapons to which we had no effective counter. Experience could not help us, for there was none. It was on us to think anew and devise our own salvation.

THE SMUTS' MEMORANDUM

On 11th July, the Cabinet decided to set up a Committee, with the Prime Minister as chairman, to report on home defence arrangements in particular and on air organization and the direction of air operations in general. The Prime Minister had no time to lend more than his name and the main responsibility fell on Smuts.

Smuts lost no time. He submitted his two reports—the first on Home Defence on 19th July, and the second, covering the broader issues, on 17th August. As far as the Air Force is concerned, this second report is an historic document. It foretold the inception of a unified air service and contained the following words :

" But careful staff work is here in the terra incognita of the air even more essential than in military and naval operations which follow a routine consecrated by the experience of centuries of warfare."

He saw that air operations as a whole, and air defence as one part of them, required unified direction and a thinking machine behind it which could sift the wheat from the chaff. I have recalled the two raids of 13th June and 7th July, 1917, and their effect, because though small in themselves, they formed the first essential piece of background to our story of air defence.

INCEPTION OF THE AIR STAFF

As one result the Air Staff was set up. Though many eminent minds contributed to the sharp exhilaration of this renaissance in the military art, four names are pre-eminent : Smuts, Winston Churchill, Sir David Henderson and Lord Trenchard. Between 1918 and 1939 the effects of this new venture became visible until, at the end of the period, on the outbreak of a second war, they were fully apparent. As a whole, and as always, we were unready, but in so far as we had made preparations, air defence was well ahead. Even in air defence during those lean years it was often like selling a lot of things you haven't got to a lot of people who don't want them.

Up till 1934 the problem of air defence, with the decreasing margin of speed between fighters and bombers, had seemed well nigh insoluble. The turning point may be said to have been reached in March, 1935, when the first Treasury grant was obtained for Radar. Two other major components of the defence were added later : the 8-gun high performance fighter, and the Group and Sector organization in Fighter Command. As the shadow of war approached, Lord Dowding worked feverishly to perfect a system of air defence proof against the great events and trials to come.

AIR DEFENCE CONSIDERATIONS

Before I go any further, perhaps I ought to say one or two words about air defence generally so that, when going into subsequent detail, we can preserve a sense of balance. Security of our island base is universally realized as fundamental. Indeed, our ability to continue to conduct war against a major Power or group of Powers depends on this. In the Battle of Britain victory was only the beginning of a gigantic offensive effort ; but defeat would have meant the end of the war.

It follows from what I have just said that in respect of such forces as we maintain for air defence, we must keep them in all respects ready to fight. The Admiralty has always worked on this principle in relation to our first line naval forces. Talking of naval affairs, I am reminded of the very significant words in Mahan's *Influence of Sea Power on History*—

" If time be, as is everywhere admitted, a supreme factor in war, it behoves countries whose genius is essentially not military, whose people, like all free people, object to pay for large military establishments, to see to it that they are at least strong enough to gain the time necessary to turn the spirit and capacity of their subjects into the new activities which war calls for."

The problem of defending these islands from air attack can never be isolated from the conduct of air, sea, and land operations elsewhere. The function of the defence is to enable us to endure the enemy blows until we can ultimately gain a decision by offensive action. But the best way to defend ourselves is to strike out boldly at the enemy as soon as our strength is sufficient, with the Navy, Army and Air Force acting together. Moreover, used purely defensively, the aircraft is at a serious disadvantage. It is at its best as an offensive weapon and needs the initiative to exploit its flexibility and penetrative powers.

Another point is this. Defence against air attack, if it comes, is a highly composite activity in which a number of arms are employed in concert. That word brings to mind the analogy of an orchestra. Now, an orchestra in which all instruments were not closely and intimately controlled by one conductor would be chaotic. Similarly, an air defence organization consisting of aircraft, guns, searchlights, balloons, radar reporting stations, observer posts, decoys, and counter-measures that did not respond quickly to the wave of the baton would be impotent in the face of a well-planned air attack. While it is true that in listening to an orchestra we can detect varying degrees of merit in the way the different instruments are played, yet the performance of a piece of music like a symphony has, in the last resort, to be judged as a whole. Some of our worst operational conundrums arose through difficulties in orchestration.

My third point is that the power of the nation to endure bombing is largely dependent on good organization and the stoic virtue of the civil population, so that a supremely important part of air defence is what we call Civil Defence. During this war we had twelve Regional Commissioners assisted by staffs on which many Ministries were represented; Food, Health, Information, Transport, Works, Fuel and Power, and the G.P.O. Various public services were controlled by the Commissioners: A.R.P., N.F.S., Local Authorities, Police, and Medical Services. You know what the main Civil Defence measures were: black-out, warning sirens, including a special factory alarm system, bomb disposal, demolitions, evacuation of casualties, first-aid repairs, and construction of air raid shelters. All this vast effort, so much of it inconspicuous and voluntary, became, I think, the admiration of the world. To do justice to it would need a separate lecture. All I can say here is that without it the casualties and moral effect of air attack would have been far greater, and it was in every sense complementary to the active defence with military and air force weapons.

THE ORGANIZATION OF AIR DEFENCE

Let us turn again for a moment to the active defence system. When the organization was fully developed towards the end of the War, the whole country was divided up into about twenty Fighter Sectors controlled by five Fighter Groups under Fighter Command Headquarters. The Air Officer Commanding-in-Chief, Fighter Command, was in operational control of all arms—fighter squadrons, guns, searchlights, balloons, counter-measures, and decoys of various kinds. The guns and searchlights themselves were under the command of the G.O.C.-in-C., Anti-Aircraft Command, and were administered by the War Office. Ultimately the control of all weapons was based on two delicate and complex organizations: the raid reporting system and the communications system. In 1944, we had about 250 Radar Reporting Stations round our coasts with some inland, to track enemy aircraft coming in over the sea, and a network of over 1,400 Royal Observer Corps posts to plot aircraft flying over

land. We had also a vast nexus of communications, radio telephony and land line : 2,000 private telephone lines, 60,000 miles of wire, 470 teleprinters, with 16,000 signals personnel and 150 highly trained G.P.O. engineers. These were necessary because instant control had to be exercised over between 600 and 1,000 aircraft, 3,000 guns, 3,000 to 4,000 searchlights, and 2,000 balloons. The nerve ganglia of the system were the Operations Rooms at Headquarters of Fighter Command, Fighter Groups, and Fighter Sectors.

The complexity of this organization was dictated by the time factor. At 200 miles an hour it only took enemy bombers 15 minutes, at 300 miles an hour 10 minutes, to reach London from the coast. Time being the essence of the problem, every commander at groups and sectors, according to his sphere of responsibility, had to have enough information to produce a physical display in his operations room so that he could issue his orders to aircraft, guns, searchlights, and other weapons in time. The unique vulnerability of some of our vital targets, especially London, in relation to the far-flung crescent of German bases ringing us round, forced us to go on developing this intricate and highly responsive mechanism. At its zenith in 1944, it reached a remarkable pitch of scientific and military ingenuity. As the German bomber pilots freely admitted, the defence was pretty hot. Earlier on during the Battle of Britain, all the elements were there but they were, of course, more rudimentary.

DAY INTERCEPTION IN 1940

The Battle of Britain period has been so well written up that there is no need for me to dwell very long on it. There are just two salient features which I have mentioned, but which I think are worth enlarging on a little. These are the time factor, and the Group and Sector organization.

The Time Factor. In those days pilots at what was called Readiness had to be airborne within five minutes. Often they did it in less, and got it down to two minutes. Thus the time taken from the first hint of the presence of enemy aircraft until the pilots were airborne to intercept was about six minutes : two and a half minutes from radar tube to operations room table ; one and a half minutes from Group controller to the pilots at dispersal point receiving their orders on the loud-speakers ; two minutes to airborne time. Later on, in the tip-and-run raids in 1942-43, a special organization was put in to cut this time. There was a case of a F.W.190 being shot down from a standing start eight minutes after it was first reported by radar.

The Group and Sector organization. Normally Fighter Command held a watching brief and did not interfere in day-to-day operations except on questions like inter-group reinforcement. The Group Commanders set the battle and ordered off the appropriate squadrons, using the Sector organization to give effect to their orders. The Sector Commander then took over and arranged the actual interceptions, when the affair was taken on by the formation leaders in the air. Responsibilities at the various levels were carefully balanced to ensure the maximum flexibility and the efficient concentration of striking power where it was most needed.

Without this system we could never have won the Battle of Britain ; without radar ten times the defending force could not have achieved the same results. On 15th September, 1940, 21 squadrons were airborne, and the panels in No. 11 Group Operations Room showed that 21 squadrons had engaged the enemy, with results not unsatisfactory to us. That day the enemy took a knock from which he never wholly recovered. That day, too, was the apocalypse of Lord Dowding's life-work.

I must here say a word about the guns. Under the magnificent leadership of General Sir Frederick Pile throughout the War, they progressed in accuracy and volume of fire from strength to strength. Even in those days, and without their beautiful and intricate control equipment which came later, they took no small toll of enemy aircraft by night and by day. Beside those destroyed by gunfire, a high proportion were turned back and dropped their bombs in open country or the sea. The guns also rendered direct service to the fighter aircraft by breaking up enemy formations and by indicating their position by shell bursts.

NIGHT INTERCEPTION IN 1943

Now let us skip three years. The march of science has given not only us but the enemy new and more deadly equipment. They have improved radio navigation aids, they have fast and better armed and armoured bombers. We have developed night fighters carrying airborne radar (A.I.) and ground controlled interception radar stations (G.C.I.) wherein both friend and foe can be seen together by the Controller on the Cathode Ray Tube, and interceptions effected in the dark or in bad weather. Radio telephony, which serves to connect Controller and air crew, has made great strides and the V.H.F. system gives more channels of communication, greater range, and clearer speech.

The technique of night interception needed on the one hand a great scientific effort, and on the other much specialized training of pilots and radio navigators. Consequently, it was developed slowly and somewhat painfully. The problem of detecting, intercepting, and identifying an enemy aircraft at night was far more severe than that of attacking him. For one thing, the final approach had to be done by visual means, and the range at which this was possible varied tremendously with background and with what sort of a night it was. In moonlight it might be half a mile; on a dark night against a starlit background perhaps 200 yards. It was found that, in general, the only way to bring off an interception was to get behind and overtake in the same direction as the enemy was flying. Recognition had to be by silhouette and the danger of shooting down a friend was ever present. The function of airborne radar was to enable the attacker to get within visual range and, if he lost sight of the target, to regain it.

As I said before, the defence worked on the same principles as it did in the Battle of Britain, but in 1943 we observe an advance in organization. When the Group Commander has planned the battle and deployed the forces, the Sector Commander takes them over, but a regular procedure at night is now to delegate the responsibility for detailed interception to the G.C.I. station with its highly organized radar display.

Let us suppose it is an evening in October, 1943. We are at Sopley G.C.I. station in No. 10 Fighter Group. Sector headquarters is at Middle Wallop, and Group headquarters at Colerne, near Bath. The chief controller Sopley has a fighter controller in the main display room and two more controllers in separate cabins called the Yellow and Red cabins. A raid is coming in from the Cherbourg Peninsula and is heading for Portland Bill. The target looks like Bristol.

The Group Commander has planned the defensive programme for the night. Orders have been issued to Sector, and three of the Beaufighters from Middle Wallop are already on patrol twenty miles South of the coast between St. Catherine's Point and Portland Bill. Let us follow the fortunes of one of them whose call-sign is

Blanket 32. The pilot is Flight Lieutenant Stokes and the radio navigator is Flying Officer Mortar. At 6.30 p.m. Stokes was taxiing gingerly round the perimeter track at Middle Wallop checking out with flying control on his R/T. He is cleared and roars away into the darkness.

Stokes then climbs to 6,000 feet over base, changes R/T frequency, and reports himself to Sector. The Sector Controller hands him over to Sopley Fighter control. Let us say Springboard is Sopley's call-sign. Stokes calls up: "Hullo Springboard; hullo Springboard. This is Blanket 32. Do you hear me? Over." Almost at once out of the shadowy sky comes the laconic voice of the Fighter controller, "Springboard to Blanket 32. Hearing you loud and clear. Vector two zero zero, angels 10." (Which means, "set course of 200 degrees and fly at 10,000 feet"). This course takes Stokes across the coast and twenty miles South of it. He can dimly see the coastline as he crosses it and now below him is the immense dark bowl of the sea. He maintains his vigil for about half an hour, during which time he is handed over to the Yellow cabin controller at Sopley on another R/T frequency.

At 7.22 p.m., Yellow cabin controller says: "Blanket 32 from Springboard. I have some bandits for you, approaching from one eight zero angels 10. Vector one niner seven. Maintain angels 15." Stokes is then given further courses and alterations of height until he is close to the incoming bombers. At this stage Yellow cabin controller tells him to search with his airborne Radar (A.I.) and gives him the course, height, and speed of the enemy.

Flying Officer Mortar, his radio navigator, is sitting in the back seat of the Beaufighter, with his eyes glued to the Cathode Ray Tube. His voice comes through on the inter-com., "Navigator to captain; navigator to captain, contact." Mortar indicates that the target is at three miles range above and to the right. His job is now to direct Stokes to a position behind the enemy at a range of approximately two miles. Mortar then tells Stokes to throttle back until the range remains constant, that is, he is travelling at the same speed as the enemy.

As he flies through the night, as yet having seen nothing, Stokes makes a rapid mental appreciation. No cloud—had probably better approach from below—enemy will have sky for background—should be able to see him before rear gunner, seems to me. Meanwhile Mortar's voice is coming through on the inter-com., "Navigator to captain—increase speed by 20—hold—ease off—hold—port a little—steady—starboard a little—....." thus enabling Stokes to approach slowly on the same course from behind and below.

At last, after what seems an age, Stokes sees the enemy aircraft against the sky. Keeping below, he looks for features such as the shape of the wings, the number of engine nacelles and the position of the exhaust flames, so as to identify the aircraft he is intercepting. He recognizes the aircraft as a Ju.88. The aircraft is not unlike his own, the Beaufighter, so that as a final check he looks at the tail plane. He looks for the characteristic taper which will identify it from the Beaufighter. A moment more and his decision is taken. It is a Ju.88 and so far he is unobserved.

Stokes now drops back to a range of 200 yards, gently raises his nose, gets the Ju.88 in the faintly illuminated ring of his reflector sight—and presses the firing button. There is a great gout of flame and Stokes banks steeply to avoid the burning debris. Twisting his head round, he watches the Ju.88 spiral down till it hits the water with a bright flash. He makes a quick check to locate any damage, and then gets ready for the next round. Yellow cabin controller comes up again, "Vector

zero seven five, zero seven five, angels 7. Stand by for second bandit." So through the night the game of hide and seek continues, in which those on the ground and those in the air, unseen by each other, yet with the mutual confidence of hard training, contrive the undoing of the enemy.

THE SPIRIT OF THE AIR DEFENCE

I have put a certain amount of detail into the story of night interception in 1943 because I want to emphasize that in the study of air defence it is most important not to overlook the point of view of the men who actually do the job : the air crew, the controllers, and the flight and squadron commanders. Neither organization nor plans which do not come to grips with practical issues are likely to work or to command the confidence of the men at the business end.

From 1943 onwards, the same work was carried on until, after a last effort by the *Luftwaffe* in the Spring of 1944, the enemy bombers no longer ventured, at least in any numbers, over our coastline. Meanwhile, ever since the Battle of Britain, new and improved types of aircraft had been coming into service ; in the spacious days of Sholto Douglas and Leigh-Mallory, the Beaufighters gave way to the faster Mosquitoes, and the Hurricanes to the Spitfires, Typhoons, and Tempests.

Though equipment improved, one factor remained constant throughout. It was the spirit that imbued air crew, anti-aircraft gunners, balloon operators, controllers, signallers, and maintenance crews alike. In Fighter Command we used to call it the 30-second complex. It is exemplified in the following anecdote. Recently we have been giving a lot of attention to what is called planned maintenance and planned flying. The idea is to run the show with due regard both to operational efficiency and to maintenance resources. A class was in progress where some air crew were being taught this subject. The instructor asked one of the class a question. He said, "If 50 enemy bombers were reported approaching your airfield, and you had 24 fighters serviceable with pilots, and 18 were ordered up to intercept, how many would there be left ?" The student replied without hesitation "None." "Come, come," said the instructor, "that surely is not right. There would be six left." "No, Sir," said the student, who happened to have been in Fighter Command, "You may know arithmetic, but you don't know the Fighter boys."

GERMAN BOMBING CONCENTRATION IN 1941 AND 1944 COMPARED

I have two slides showing a comparison between the German bombing concentrations in 1941 and 1944. The first one shows the fall of bombs on May 10th/11th, 1941. This was the raid in which the Germans got their best concentration. The other diagram shows the fall of bombs in thirteen major attacks between January 21st/22nd and March 24th/25th, 1944, when our defences had improved considerably. The concentration is only about a quarter as good, and this was the best the Germans could do in 1944. The lack of bombing concentration was due as much as anything to our victory over the enemy in the tactical use of Radar. May I repeat what I said previously, that the function of the defence is to parry the enemy blows until we can gain a decision by offensive action. I think the slides I have just shown you indicate that the defence did do its job.

Well, we did parry the enemy blows, with difficulty at first, and later with increasing success until in the end we had destroyed about 5,000 of his aircraft that came over our coast. We gave him measure for measure and punch for punch. But after 1943 our punches grew and his punches waned. I do not know whether

it is generally realized that Fighter Command did not conduct by any means all its defensive operations over this country and its approaches. During the last two and a half years of the War, the Fighter Command Mosquito intruders were ranging far and wide, from the coasts of the Baltic to the Upper Danube, destroying German aircraft in the air and on the ground, on or over their own airfields.

Thus we see the pattern of the defence weave itself into the pattern of the offence until the whole design attains coherence. For example, not until we had survived the Battle of Britain and Fighter Command had given the requisite measure of security to our main base, could the Government contemplate large scale overseas operations. From then onwards, our air operations were concerned with extending our zone of air superiority farther and farther away from London and the Midlands. Little by little we succeeded in pushing it over the Channel, then over the great Continental estuaries, then, with the help of our American colleagues, over the Westphalian plain into the heart of Germany. In due course our Navy was able to transport our Army to the Continent under the presiding wings, and the Army and Air Force at last pushed the *Lufwaffe* and the S.S. rocket batteries out of their bases in time, but only just. Every operational command at home played its part, and they co-operated well because the higher direction was good.

REFLECTIONS ON THE FUTURE

All the same, after our recent experiences, the future does not put most people into one of their happier moods. It makes me think of the farmer who wanted to insure his barns against fire. The insurance agent came to see him, and after looking round for a bit, asked the farmer what means existed in the village for putting out fires. The farmer scratched his head and thought for a long time. Then he said, "Well, sometimes it rains." Now that outlook will not do for us. We have just got away with it twice, the last time only by a very narrow margin. The third time, if we were insufficiently prepared, our luck might not hold.

In my opinion, however, there is no reason why any one need think like the farmer I have just mentioned; no need, either, to behave like the White Queen who screamed first and pricked her finger after. Among much that is uncertain, of this I am sure: what may happen in the future is not entirely a matter of chance; it depends very much on what we decide to do now.

Let us face the problem squarely. A good air defence is very costly; but a bad air defence is ruinous. Furthermore, the better that the United Nations Organization progresses (which every man and woman with any imagination devoutly hopes it will do), and the more furiously that peace rages, the more acute will be the difficulties of maintaining general agreement on the scale of air defence that ought in the circumstances to be kept up. It is at least clear that whatever we do have, in quality it ought to be the best we can afford, for we can only afford the best; it ought also to be a little more than ready, for it should if possible be a lap ahead. It should be remembered that the last word on the problem of interception is never said, and that all target-seeking missiles contain the seeds of their own destruction. However much we are able to keep the technique of Air Defence in the forefront of technical progress, it is no use pretending that it can be a substitute for the offensive use of air power. The best deterrent to armed aggression, and indeed the only real answer to it, is the science, the strength, and the confidence of our punch. And this truth will deepen as the destructive power of weapons grows.

Since we enjoy the doubtful privilege of inhabiting the most vulnerable target

in the world, its general characteristics should be of more than passing interest. Consequently, I think it is worth while taking a glance at the relationship of Air Defence with the future growth and texture of the British Commonwealth and Empire. I am going to suggest a metaphor. Let us call these islands, and particularly London, the stomach of the Empire. I don't want to press it too hard—the metaphor I mean, not the stomach—but at least the stomach in relation to the body and Great Britain in relation to the Empire have some points in common; first, in respect of their lack of natural protection, and secondly in respect of their service to humanity as a focus of morale. We all remember Henry V's: "That he which hath no stomach for this fight, let him depart." Now it is inconvenient to fight anyone who may hit you below the belt, but having to fight and defend your stomach with indigestion at the same time is really awkward.

In this connection, it is well to bear in mind a few simple facts. The land area of the British Isles is roughly 100,000 square miles and contains 48 million people, of whom eight and a half millions are crammed into the 700 square miles of Greater London. Writing in the First Century A.D., Tacitus referred to London as "widely renowned for the number of its business men and the density of its traffic." If it was like that then, what is it like now? The land area of the Commonwealth, if you exclude India, is 13 million square miles and its population is 150 million. Hence, whereas Britain contains nearly one third of the population, it is about 130 times as small. It is not unreasonable to conclude that as a stomach it is overfilled. We might even go so far as to admit that we are suffering from a considerable amount of social, economic and industrial indigestion.

Common sense would seem to suggest that it would be to the mutual advantage of various members of the Commonwealth if we did what we could to spread out a bit more evenly. Anyway, it is surely crazy to go on bunching up with a kind of economic corpulence. Deliberate creation of alternative sources of supply and manufacture in the countries of the Commonwealth, linked up by improving communications, would be a form of strategic dispersion. It would not only ease the problem of air defence, but would assuredly promote Imperial health. To pursue the metaphor we might even compare such higher level of activity in the limbs of the Commonwealth to the beneficial effect that exercise of the arms and legs has on the relief of indigestion. I hope the arms and legs will not take offence at my saying this from my abdominal standpoint; after all it is to their advantage to see that the stomach is in order, and well cared for and protected.

In the unhappy event of peace breaking down, it would be much harder for an aggressor to inflict crippling damage—indeed there would be less temptation to try it—on a system without such a super-sensitive solar plexus. A lecture was given from this platform just twenty years ago on the subject which I have been privileged to talk to you about this afternoon. May I end by quoting a passage from the lecturer's final remarks.

"And last of all, in this Institution, it is perhaps just and appropriate to emphasize that a real scheme of Air Defence is not a mere selfish national consideration; it is in fact the strongest link in the great and delicate chain of Empire."

DISCUSSION

AIR CHIEF MARSHAL SIR ROBERT BROOKE-POPHAM: I wonder whether the Lecturer could throw a little light on the question of defence against the flying bomb, to which I do not think he referred.

THE LECTURER : The interesting feature from the strategic point of view of the flying bomb attack was that nobody knew quite when it would come. You will remember also that at that time the whole disposition of air defence had to be orientated towards protecting the launching of our offensive effort. A.D.G.B. had to be denuded to the utmost to ensure that our soldiers and sailors had the very best support that the Air Force could give them. Therefore, we had to leave ourselves with what I might call a third eleven to play on the home ground. The Germans knew that, and although they were not quite ready, they had to hurry and launch their flying bomb attack slightly prematurely. Their bases had been bombed, but they managed to mount a scale of attack which was in its way quite formidable. Our job was to keep it down to such proportions that it would not have the effect of compelling us to bring back fighters to protect these islands.

At first it did not look too good because, as I say, we were a third eleven which had been pared down to the limit. Another problem was that, although we were able to catch the flying bomb with the fastest fighters, we had to flog them to enable us to overtake the flying bombs and shoot them down. Incidentally, Hitler thought we should not be able to catch them because the Germans had carried out experiments with a captured Spitfire which apparently was not able to catch the bomb. However, we got the Spitfires 9 and 14, the Mustang and the Tempest, so we were then better equipped for dealing with the flying bomb.

I should like to pay tribute to Anti-Aircraft Command, who ended up the major partner in this battle. They had certain new control apparatus which enabled them to handle the job, and they did so with tremendous success. We realized that stooging up and down in fighters on standing patrols was a most wasteful way of operating. We could not scramble the normal way in time because the low height at which the bombs came in did not give us sufficient warning. We were also coping with a lot of friendly traffic which made Radar very difficult, but the guns took 70 per cent. of the " takings " in fine weather, and in bad weather were also always able to do their stuff.

During the last week of the battle I had the satisfaction of seeing a total of 98 destroyed out of 101 flying bombs that came across the coast. I think we can say broadly that the flying bomb attack did not deter us in any essential respect from prosecuting the invasion, which was the essential thing at the time.

AIR VICE-MARSHAL SIR H. BROADHURST : I am rather more interested in the rocket. I do not know whether the Lecturer can give us any information as to whose responsibility the rocket is going to be. I know from the fighter pilot's point of view that it is not viewed with much enthusiasm.

THE LECTURER : I am not entitled to speak on the future organization for dealing with the rocket. I think the German flak organization had a good deal of trouble with it, and the *Luftwaffe* was also involved. With regard to our own future, however, of course our plans are not fully developed, but it does constitute a difficult problem. I think one can say that the Services, the Supply Ministries and the Research Organizations are drawing closer together, and it may be that contributions will have to be made by the different Ministries according to their special capacities to deal with the newer problems that are cropping up.

AIR VICE-MARSHAL T. W. ELMHIRST : I should like to refer to Radar and the Observer Corps from practical experience. On 15th September I happened to be Duty Air Commodore in Fighter Command Operations Room, and I remember the board showing 1,000 enemy aircraft. I think for the Radar organization to have been able to pick out what was what and give it to Sector Commanders was a truly magnificent piece of work. The organization had, of course, been worked out by Lord Dowding during the preceding years, but it came as a shock to enter that room and see 1,000 enemy aircraft all over the country.

Then with regard to the Observer Corps, I can remember a night in October, 1940, when a raid appeared from Cherbourg. A single raider came in over Portland and was not missed the whole time, although it was a dark and cloudy night, until he passed out over the Shetlands. That, I think, showed how wonderful the Observer Corps was, even when it was dark and the plane could only be heard.

THE LECTURER : I should like to take that up. When the Observer Corps was trained it did absolutely wonderful work. Its members had the most uncanny knack of picking out enemy aircraft from a large number of planes, purely on sound. Sometimes when nothing had been tracked in at all, they would stick to their point and say there was an enemy aircraft about. It showed really what the human ear together with training could do.

THE CHAIRMAN

I am sure you will all be agreed that we have heard a very interesting and comprehensive account of Air Defence and Air Defence problems. The very wide scope and, one might say, the intricacies of the subject have been presented to us in such a way as to leave us in no doubt at all as to the importance of the subject.

The recent war, like most wars, has proved that the security of the base is one of the first essentials. The security of the base, as has been pointed out by Mr. Arthur Bryant in his book *Years of Victory*, in the long run proved to be the undoing of Napoleon and, in the recent war, proved to be the undoing of Hitler.

Again, as the Air Marshal emphasized, victory is not won by defensive measures alone. In fact, one might say it is not won until Tommy Atkins arrives or is about to arrive on the final objective. Having heard the lecture, and having in mind all the modern machines of war and destruction which have deprived the Mother Country of her insularity and security, one cannot but be impressed with the magnitude of the problem of Imperial defence which is before us to-day. Air Defence alone has been shown to be a big problem, but it has to be viewed in its proper perspective. In times like these it is natural to forget the crises from which we have emerged, not only in the recent war but also in the previous one, by so narrow a margin. Very few care to contemplate how narrow the margin was, and fewer still like to reflect on the consequences of less fortunate results.

In the opinion of many—and I share their views—there is only one realistic way of preventing war and that is by means of power in the hands of peace-loving nations. Power is expensive, and to provide adequately for all forms of Imperial defence is going to be an immense strain on our resources of men, money, and material.

I think it is true to say that none of the Services are going to be impressed by treaties, and in spite of the United Nations Organization they will not be impressed by the somewhat worn-out theory that there is going to be no more war. On the other hand it is certain that none of the Services are going to get the men, equipment and armaments which they will deem to be necessary for security purposes. That problem, which is immense, can only be solved by sound and realistic diplomacy and by Imperial and inter-Service co-operation in its broadest sense.

I am sure that none of you would like to leave this hall this afternoon without paying a tribute to the courage, resourcefulness and exploits of the fighter pilots and the crews of the bombers who took part either directly or indirectly in the defence of this country, nor without thanking Air Marshal Sir Roderic Hill very cordially for presenting to us so clearly one aspect of Imperial defence which, in the light of modern invention and our experience, we must regard as being of the first importance.

I would ask you, therefore, to express your appreciation of the admirable talk given by Air Marshal Sir Roderic Hill.

The customary votes of thanks to the Lecturer and Chairman were carried with acclamation.

IMPERIAL DEFENCE¹

By COMMANDER G. M. BENNETT, D.S.C., R.N.

THE saying that Britain loses all her battles except the last epitomizes our traditional unreadiness for war throughout history. The seed of our failure to make adequate preparations for the 1939-45 war was the popular belief, fostered by the Governments of the time, that the conflict of 1914-18 was a "war to end war"; and the seed germinated in the establishment of the League of Nations as a means of implementing this policy. The League as an instrument for maintaining peace failed through pursuit of the idea that permanent peace could be brought about by general disarmament, and the complementary failure to realize that civilized man must first learn to forgo force as the ultimate means of settling disputes between nations.

The roots of Britain's failure to prepare for the present war grew and flourished in the misguided unilateral lead in disarmament which we gave to the world. This, and a national reluctance to pay the insurance premium necessary for defence, resulted in the strength of our fighting forces reaching a dangerously low ebb, both in quantity and material quality.

Twice in the early 'thirties the League was successfully flouted: by Japan against Manchukuo and by Italy against Abyssinia. In 1936 the incipient aggressive intentions of Germany, together with a realization that the League as an instrument for preventing war was a failure and that the British Empire was endangered, led us at last to make preparations for war which was to come in three years—a period too short to remedy the neglect of the last decade and a half.

When war came in September 1939, we were not entirely unprepared; the first months proved that our limited fleet was highly and realistically trained; the R.A.F. was brilliantly trained, whilst the quality of its aircraft was of the best—the proof lies in the Battle of Britain; conscription had been introduced, thereby paving the way for the formation of the great armies which were to be required when France collapsed; the women's services had been started; A.R.P. services had been organized and trained; stocks of food had been gathered ready for the day when our normal imports would be interrupted by the war at sea. These preparations helped us to ward off early ignominious disaster. But they do not obscure the fact that we lacked warships, aircraft, tanks and guns, together with the necessary men to man them; that we had neglected our mercantile marine and ship-building resources to such an extent that lack of shipping was throughout a serious limiting factor in the conduct of all our operations; that we had failed to realize the vital part air power was to play when used in direct conjunction with sea and land forces. In these and innumerable other ways we were so unprepared that we suffered more and greater defeats and temporarily lost more British territory than in any previous war; so unready that it took us three years of "blood, sweat and tears" to stem the ever-advancing enemy; and three more years before victory was ours.

¹ This is an abbreviated version of the essay awarded the first prize in the Trench-Gascoigne Competition of 1942. The subject was:—

"What lessons have we learnt from our unreadiness for war and how can we best ensure that the Empire will live more securely in future."

Official approval for publication was withheld until after the War.—EDITOR.

The immediate lesson to be learnt from our unreadiness is that the Empire must in the future be fully prepared to defend itself against attack until such time as the development of human civilization reaches the stage at which resort to force by one nation against another is considered by the remainder a crime against humanity, and dealt with by them accordingly. Universal will for peace cannot be attained by disarmament. For the present we must take human nature as it is, realize its shortcomings and adopt the policy that defence in the form of readiness for war is vital, not merely to the free existence of Great Britain but to the whole British Empire.

A change in our ideas of the meaning of Imperial Defence is the next lesson. In the XVIIIth Century when the colonies were young and undeveloped, England was naturally responsible for the defence of the whole Empire. Through the years this conception has slowly changed until in the present Century the Dominions have played a part. But though the history of both the last wars shows that part to be a glorious one, it must not blind us to the fact that it has been insufficient. As far as preparation for war in time of peace was concerned it meant little more than that the Dominions provided small naval, military and air forces of their own, inadequate for their own defence and, compared with the forces maintained by the Mother Country, far from commensurate with their resources.

The time has come when Imperial Defence should be truly imperial, every part of the Empire making its proper contribution. No part of the Empire should be in a position to jeopardize the defence of the remainder by a failure to play its part. None should be able to remain neutral when war is declared, for not only is the whole Empire then deprived of its armed forces and perhaps its productive capacity and natural resources, but it is deprived of the use of its sea and air bases. One hardly dares to reflect on what might have been the present plight of the Empire had, for example, South Africa remained neutral and we were, with the Mediterranean sea route virtually closed, deprived of the use of Cape Town, Durban and other South African harbours: the catastrophic effect upon sea communications between Britain and the East needs no emphasis. Eire, though for reasons unconnected with defence a special case, is a concrete example. Had we not been deprived of the southern Irish ports, so well placed for the defence of the Western Approaches, the tale of our shipping losses in the first years of the Battle of the Atlantic would have been a different story.

Before a policy of true Imperial Defence can be developed the Statute of Westminster will require revision. It is not sufficient that the Empire should be held together by common allegiance to the Crown alone, apart from the abstract link provided by natural affection for the Mother Country. If the Dominions are to remain in the British Empire each cannot be entirely free to pursue a policy differing from that of the others; but if the British Empire is to have a common policy the Dominions must have a proper voice with the Mother Country in shaping it. It is a short step to an Imperial Government in the form of an Imperial Cabinet responsible to an Imperial Parliament whose members are elected by every Dominion and Colony, the number of members contributed by each being dependent upon their population, resources and similar factors. With modern methods of rapid air transport, such a parliament sitting in a suitable central position is a practical proposition.¹

¹ One uses the word "parliament" for want of a better, but no ordinary political debating chamber is intended. A greatly enlarged Imperial Conference permanently in being is perhaps nearer the mark.

The responsibilities of this Imperial Government would be limited to matters which concern either the Empire as a whole or any two or more Dominions or Colonies. Of these the principal ones are Foreign Policy and Defence.

THE NAVY

As long as the trade of the world is carried in ships the core of the Empire's defensive strength must be its Navy.

The Navy's main object in war may be summed up as being to obtain command of sea communications. This involves ability to neutralize the activities of the enemy's fleet whether they take the form of attacks on shipping or attempts to land an invading force and, ultimately, both involve ability to defeat any concentration of enemy warships which may be brought against us in any part of the world.

The principles on which the strength of the Navy should be calculated and maintained in peace are partly relative, being dependent on the size of the navies of other Powers, and partly absolute, being dependent on the volume of our trade and the lengths of the trade routes. Firstly, fleets should be maintained in such parts of the world as enemy fleets are likely to be brought against us. Each of these fleets should be at least equal to and preferably stronger than any combination of fleets with which they are likely to give battle. Secondly, such forces should be available to provide reasonable escorts for convoys from the outbreak of war until war construction of such craft can take effect and provide full escorts. Thirdly, in addition to the main fleets, sufficient ships should be maintained to provide effective forces to patrol the trade routes, more especially in those areas where convoys are not justified, against the operations of enemy raiders. Fourthly, sufficient submarines and light surface craft should be available to enable these vessels to play their important offensive, defensive and reconnaissance roles from the outbreak of war. Finally, the Naval Air Arm should be of such strength, both in ship-borne and land-based aircraft, as to permit effective co-operation—fighter protection, bombing, patrol and reconnaissance—with all types of surface forces.

A regular programme of replacement of all types of units should be maintained so that vessels obsolete, in comparison with those of other Powers, do not preponderate. The type of vessel built by other Powers should be watched and adjustments in the composition of our own naval forces made accordingly.

THE ARMY

To maintain in peace an Army on the continental scale would not only be a waste of man-power but a total disregard of the advantages bestowed on us by geography. If we have command of the sea, including the air above it, large-scale invasions on British territory are impracticable, but raids both by sea and by air, whether in the form of bombardment or troop landings, are still possible. The first requirement for our Army is therefore that it shall be of sufficient size to maintain adequate forces for the defence of all points where such raids are likely. The chances of such raids taking place by sea or air on any particular part of the Empire depend upon its proximity to potential enemy territory and its war value both to us and to the enemy. The scale on which military forces should be provided will therefore range from the armies necessary in Great Britain and the Dominions, through the garrisons required at such isolated bases as Gibraltar and Malta, to the very small forces required at such points as Ascension Island or Barbados. In certain cases, of

which India is the major example, an additional factor governing the size of the forces required is the necessity for maintaining internal security.

Calculated on the above principles the size of the Army will not be large, but just as the Navy, though designed in peace primarily for defence, must be capable in war of attacking and destroying the enemy's fleet, so must the Empire be ready to put into the field in war an Army capable of conquering that of the enemy, for only by this means can ultimate victory be obtained. Whereas in peace the Navy may be approximate to its war strength, this will be far from true of the Army: enormous expansion will be necessary and two wars now have shown that the only satisfactory basis of this is conscription in peace as well as in war; only thus will a large potential force of initially trained soldiers be available to reinforce the regular Army at the outbreak of war.

Though armies be largely a matter of man-power, their equipment in this mechanized age assumes ever growing importance. In future not only should our standing Army possess in peace adequate equipment from heavy tanks and guns downward, but these should be regularly replaced with up-to-date types in order to ensure that they are at least as good as those of other Powers. Secondly, an up-to-date reserve should be maintained to provide for a large increase in the size of the Army on mobilization. Finally, adequate preparations should be made in order that production of equipment on a vast scale can be put in motion without delay.

Apart from questions of personnel and material strength, the late war has shown that the British Army was in 1939 inadequately trained for war. In peace, where training is concerned, the soldier is always at a serious disadvantage compared with the sailor and the airman: ships and aircraft are constantly operating in their own elements—the sea and the air; in both man must wage constant war against wind and wave. In striking contrast the Army, with the exception of small forces engaged in local operations abroad, has been tied to the security of its barracks. Its outlook has been obsessed by such petty problems as parades, fatigues, and walking-out passes. Once a year, during the few comparatively fine summer weeks the Army at home went on manoeuvres and trained under conditions approximating to active service; but did the Home Fleet confine its exercises to the summer months? In future the Army should in peace frequently be trained under conditions similar to those of active service in so far as this is practicable; it must get out of the barrack square into the field at all seasons of the year.

There are many lessons to be learnt in connection with Army organization. Mechanization has so changed the nature of military operations, has introduced so many varied types of troops ranging from pure infantry units through paratroops to armoured forces, that the Cardwell system should go and with it any organization on a narrow County regimental basis. Each type of troop should be organized into a single Corps devoted to its particular "trade," just as the Artillery, Tanks and Sappers are now. Brigades or larger formations formed for duty anywhere in the world would consist of the necessary units of each type, the size of each being dependent on operational needs.

Finally, as with the Navy, sufficient aircraft of all types should be available to provide proper co-operation with the maximum sized military forces which can be put into the field at the outbreak of war. At the same time arrangements should be made so that the training of personnel and production of machines which will be required in order to meet subsequent increases in the strength of our land forces can be effectively implemented.

AIR POWER

In addition to the aircraft of all types required for co-operation with both sea and land forces, it will be necessary to maintain, in peace, fighter protection at vulnerable points throughout the Empire. The scale of this protection will be dependent partly on the strategic value of each position and partly on the strength of the bomber forces which may be brought against them by potential enemies. Great Britain, due both to its proximity to Europe and to its value as the heart of the Empire, will need overall fighter protection. Elsewhere this will normally only be necessary for individual points such as naval bases.

There remains the question of a bomber force for independent raids on enemy territory. This raises the still debatable question of the value of such operations. They have the twofold object of striking at the morale of the enemy population in order to destroy their war will and of dislocating their production by the destruction of factories, docks and internal transport systems. There is little evidence that either can be achieved within a reasonable interval of time. There is, however, evidence that it results in a diversion of effort from more vital needs both in a lack of adequate air co-operation for land and sea forces and in the use of an unjustified proportion of available skilled man-power, production resources and transport facilities. It is therefore suggested that independent bombing raids should either be carried out on a gigantic scale continuously from the outbreak of war, or virtually not at all until the last stages as a battering ram to hasten military collapse. Provision of the force required for the former is impracticable for any State with normally pacific intentions. Consequently, we should in peace only maintain the nucleus of an independent bomber force, sufficient for training personnel ready to act as instructors in war and for the development of aircraft and operational methods. The full bomber force would be built up during the war.

IMPERIAL FORCES

Since the defence of the Empire on a true imperial basis has been advocated it follows that its fighting forces should be similarly organized. This is already true in principle but it lacks full application in points of detail. The Navy is the nearest to the ideal since the fleets maintained by the Dominions in peace are, in effect, squadrons of Britain's fleet. Though normally stationed in their own waters, individual ships are at times temporarily attached to other stations. They are of the same type as those used by Britain and their personnel are similarly organized. In time of war all come under the control of the Admiralty and so are available for service anywhere in the world.

The organization of the Empire's armies on an imperial basis has not been so complete. Military organization and conditions of service in the armies of Britain and the Dominions, not to mention the Colonies, differ. Whereas the British Army may in peace be stationed practically anywhere in the world, those of the Dominions and Colonies are restricted to their own territory. In both the 1914 and the 1939 war the military forces of the Empire have eventually been employed anywhere in the world; they should, therefore, be organized for this in peace and so employed. Subject to the strategic needs of the Empire as a whole, men recruited in the Dominions and Colonies would naturally do much of their service within their own territory but, with the possible exception of coloured troops, they should at times be stationed elsewhere. Furthermore, when trouble arises in some part of the world far distant from Britain—as for example that at Shanghai in 1926, the necessary forces should, in the first instance, be drawn from the nearest Dominions and

Colonies. Conscription in peace as well as war should be general throughout the Empire, at least as far as the white population is concerned. As a result each part would contribute to the standing Army in proportion to its available useful manpower.

INTER-SERVICE CO-OPERATION

It is impracticable to argue whether there should or should not be a separate Air Force within the permissible length of this article, nor is it directly relevant. Whatever the answer, it is certain that the advent of air power has raised in an acute form the problem of inter-Service co-operation. Prior to the 1939 war we failed to find a solution to it. We have learnt much in the ensuing years under the pressure of large scale amphibious operations, not to mention the many other aspects of war in which the efforts of the Services must be closely and continuously integrated. But this co-operation must be continued in peace. To ensure this it is suggested that a proportion of officers from each Service should, on reaching the equivalent rank of Lieut-Colonel, be seconded to a separate force in which all would hold a Combined Service rank. The more senior ranks of the individual Services would be limited to appointments in which co-operation did not arise, as for example, Admiral Superintendent of a Dockyard. Officers in the Combined Service would, in the first instance, receive training in the wider aspects of the Services other than their own and in general staff work, thereby absorbing existing Staff Colleges. Subsequently they would be employed both on staff duties and in command of the larger units of the various forces. The grant of honorary military and air force ranks to the naval officer appointed Chief of Combined Operations is perhaps an indication that the ultimate solution to the problem of co-operation is along these lines. Before reaching the Combined Service rank equivalent to Major-General, all would receive training in the higher aspects of war, thereby replacing the existing War and Imperial Defence Colleges.

Finally, an Imperial Ministry of Defence, which on the outbreak of hostilities would automatically assume the title of Ministry of War, should be formed to assume control of all the fighting Services in the strategic sphere. At its head would be the Imperial Prime Minister as *ex-officio* Minister of Defence (or War). Under him would be the necessary Chiefs of Staff and Combined General Staff all drawn from officers in the suggested Combined Service. Separate subordinate Imperial Ministries for each Service would be formed to deal with the administration of each, and such operational matters as might be delegated to them.

BASES

Mahan in his *Naval Strategy* uses Napoleon's dictum "War is a business of positions" seven times in order to stress the importance of bases. The loss of Singapore demonstrated in a disastrous manner the fact that a naval base was useless without a fleet to defend it. The loss of the battleship "Royal Oak" showed that an inadequately defended Scapa Flow was useless as a base for the Home Fleet—a lesson we learnt in the 1914-18 war and then forgot. There are many similar examples to stress the point that in the future, in order that the forces of the Empire may be able to operate properly, bases for fleets, flotillas and convoys should be provided with both adequate facilities and adequate defences in such positions as the strategy of to-day rather than that of a hundred years ago demands. Furthermore, the responsibility for the provision and upkeep of these bases should be an Imperial one and not left to Dominions and Colonies whose financial assets are relatively small.

The failure to provide sea bases in the correct strategic positions, particularly in home waters, was partly due to the great expense involved in transferring existing ones to new sites and partly to the vested interests of local capital and labour—the former seeing a source of profit threatened, the latter objecting to being transferred to new homes. This is understandable, if inexcusable, but the same cannot be said of our failure to think imperially in terms of air power with the result that lack of adequate air bases hampered air operations in practically every theatre of war. Reliance on inadequately equipped civil aerodromes for war purposes is a measure not to be repeated in the future. As with sea bases, "air bases" adequately equipped and defended should be provided wherever the strategic needs of Imperial Defence demand.

However adequate our sea and air bases may be the need for others, particularly in occupied territory, will always arise in war. The Navy, with its mobile naval base organization, was, to a considerable extent, prepared for this. The Air Force, though tactically the most mobile of our fighting forces, was strategically the most immobile, since even when given a suitable landing ground it took an excessive length of time to provide and install the necessary ground organization and maintenance facilities.

Air power, estimated to be adequate for defence in peace, may be established within the Empire before the outbreak of war, but the provision of air power in occupied territory during war, not to mention reinforcements anywhere in the world, must also be arranged. The lesson is that our air power must be strategically mobile. A mobile base organization must be maintained in peace.

SHIPPING

A maritime Empire is as dependent upon a mercantile marine for its existence as it is upon a navy for its defence. Apart from lessons of earlier history, the 1914-18 war, as a result of the effects of the unrestricted U-boat campaign, showed that shipping was vital in maintaining supplies of every kind. Yet from 1919 to 1939, not only did we fail to implement the many lessons we had learnt with regard to improvements required to our Merchant Navy but we allowed it to decline both in numbers and quality, and neglected the men who had served us so well. The 1939-45 war brought heavy losses due to unrestricted U-boat warfare, and many additional ones from air attack. The result was only too clearly seen in the fact that our supply position was seriously jeopardized and our war operations severely restricted. Shipping became the most vital factor in the War.

This state of affairs cannot be allowed to recur in the future. The effective remedy is to reorganize the Empire's Merchant Marine as an Imperial Merchant Navy. This does not imply a government service; but it does mean that the Imperial Government should be responsible for ensuring that the Empire maintains a number of ships sufficient for war and adequately designed and equipped for the purpose. The crews should be organized under proper conditions of service, including regular pay, even when immediate employment is not available, and pensions. Though the ships may remain the property of individual companies and be operated by them in peace, they should be built to adequate Government specifications rather than luke-warm Ministry of Transport regulations; and the crews should be organized as a whole rather than as servants of individual companies subject to the whims of their respective managements. Individual companies are not in a financial position to do all this: a Government subsidy is inevitable and in the interests of defence fully justified.

RAW MATERIAL AND PRODUCTION

There are many other matters in which the common interests of the Empire, particularly those of defence, should come before private profits. The loss of Malaya with its rubber and tin taught us that our sources of raw materials should be spread throughout the Empire. As far as practicable, arsenals and factories of every kind should be sited not only throughout the Empire so as to minimize the effect of the loss of any part of it, but also spread over each individual part so as to reduce the effects of attack, particularly from the air. The food resources of each part of our Empire should be developed so that each is as far as practicable self-supporting, thus reducing calls on shipping. Where this is impracticable, stocks should be maintained sufficient to meet emergencies.

It is not, of course, practicable to implement this policy fully. The sources of some raw materials, of which oil is the most important, cannot be moved. But just because it is cheaper in peace, for example, to obtain tin from Malaya, it is not a sound reason where defence is concerned for abandoning the not unimportant resources of this metal which lie in Devon and Cornwall. It may not be practicable to grow rubber in the British Isles, but it need not be concentrated in Malaya when it could quite well be developed in Nigeria. As far as food is concerned there can be no adequate excuse for our neglect of agriculture in the British Isles during the years 1919-39, when the lessons of the 1914-18 war should have been vividly in our minds.

It will only be practicable for the hundreds of private interests concerned to implement such a policy if they are given adequate financial assistance from the Government. There are precedents for this; for example, in the 'twenties the development of overseas wireless communication threatened cables with extinction. The Government, realizing the vital importance of the latter in war, merged the wireless and cable interests and by direct subsidy arranged for the Empire's cable system to be maintained. But never again should we have a repetition of such a case as arose over broadcasting in 1937 when, in the interests of defence, the Government considered it desirable to develop a system of wired broadcasting in lieu of wireless. Southampton was selected for a full-scale experiment which was never carried out owing to the violent opposition of local interests, chiefly wireless dealers who imagined their livelihood threatened.

By 1942 we were living in an Empire where practically everything was entirely subordinated to the requirements of war. Were we so very much worse off? Leaving out the effect of actual hostilities and the sometimes inconvenient shortage of some of the luxuries of life, it is suggested that the answer is no. The selfish and fancied rights of the individual were sacrificed in the interests of the community as a whole and to the advantage of the majority. The continuation of this policy in peace, more especially where Imperial Defence is concerned, is not only practicable but necessary for the future development of the Empire.

FINANCE

To provide the necessary Imperial Armed Forces, to develop the necessary sea and air bases, to organize and maintain an Imperial Merchant Navy, and to organize the Empire's sources of supply and production with due regard to the interests of defence will inevitably be governed by the financial assets of the Empire. It may be said that it will never be practicable to implement these policies entirely because our assets will never be sufficient. But that is far from being an argument for not

implementing them at all ; and it is an argument for developing those assets as much as practicable, for the more prosperous the Empire the easier will be the financial burden of defence. *Potentially*, the British Empire is the richest "state" in the world with the possible exception of the U.S.A.

In addition to the need for economic development of the Empire as a whole, there is another lesson to be learnt ; the cost of Imperial Defence should in the future be borne equitably by the people of the whole Empire. When this is coupled with the fact that the defence of the Empire should in future be the responsibility of a true Imperial Government, it seems clear that the solution is an Imperial Defence Tax levied equitably on every part of the Empire, supplemented where necessary by Imperial Defence Loans.

The whole of the money realized by the Imperial Defence Tax would be at the disposal of the Imperial Government. It would be divided between the various fighting Services and other defence requirements after full consideration of the needs of each. Arranging that division, and ensuring that the Service and other authorities concerned handled the money wisely, would be the functions of an Imperial Treasury. And this should be so organized that it is not in a position to exercise such an all powerful stranglehold upon the Services as was maintained by the British Treasury prior to 1939. A man provides his wife with so much a month for housekeeping. He may vet her accounts at the end of the month to see if she is spending wisely, but he does not expect her to ask his approval before she purchases each individual item during the month. Yet that was true of the British Treasury, and will be again unless the lesson is learnt that it seriously retarded and hampered the fighting Services in their preparation for war.

EDUCATION

The basic reason through the ages for our failure to maintain adequate defences in time of peace has been the gross ignorance of the majority of the population, not excluding Cabinet Ministers, of the elements of defence. The need for educating the nation in order to avoid this recurring state of affairs has in essence been represented by thoughtful men since the time of Queen Elizabeth. Unless steps are taken to do it now it is certain that, after a few years of peace, our defences will again be neglected and our security imperilled.

The continuation of universal conscription in time of peace has already been recommended. The first object will be military training ; but it will also present a priceless opportunity for educating the nation in its responsibilities as citizens. The conscription period should include courses for all, organized and conducted by the best men available, in such subjects as foreign affairs, imperial geography, world history, local, national and imperial government, and Imperial Defence.

FOREIGN POLICY

A victorious British Empire is now maintaining the fighting Services on an adequate scale. As the years pass, however, experience shows that this will no longer be true ; former Allies may become potential enemies whilst the permanent enforced disarmament of our late enemies is not practical politics. Our foreign policy is vital to the future security of the Empire since only as a result of it will fighting Services on the scale outlined in this paper be within our means.

Before the 1939-45 war all international conflicts in which the Empire was involved were primarily European wars, for the Great Powers were concentrated in that continent. The Great Powers are now spread across the world : the repercus-

sions of total war between any two of them are such that its spread to others is inevitable. War has become world wide ; as a result the Dominions and Colonies are far more directly affected than before. Therefore, in the future, British foreign policy should be a world-wide one in which the whole Empire is directly concerned rather than one with a limited European outlook in which Great Britain is principally interested. The necessary Imperial outlook in our foreign policy will be provided by the true Imperial Government which has already been proposed.

Our immediate aim to-day is to restore order throughout the world. To do this the inevitably conflicting claims of many nations, races and minorities have to be justly dealt with, whilst punishment must be applied and retribution exacted from the Axis Powers. But in attaining this immediate object a greater one should not be forgotten ; that of endeavouring to establish a new order throughout the world on the basic principles of freedom from war, freedom from want, freedom of speech and freedom of religion. The security of the British Empire ultimately rests on this. To achieve and maintain it a firm and positive foreign policy is essential, and this will be practicable if our defences are strong. It involves the maintenance of friendly relations with and between all nations, including the solution of the problem of the "have" and the "have not" Powers, and the maintenance of the balance of power throughout the world. If, in spite of this, any nation or group of nations should show signs of aggressive intentions we should be unmistakably determined to suppress them before they can grow in strength to the extent of yet again menacing the peace of the world. Never again should appeasement—the direct result of weak defences—be recorded in our history.

One more lesson, which can best be expressed in the words of General Smuts, remains :—

"The future policy and association of our great British Commonwealth lie more with the United States of America than with any other group in the world. . . . The British Commonwealth has its feet in both worlds. Through Great Britain its one foot is firmly planted in this old continent. Through the Dominions it has its other foot as firmly planted in the outer, newer world, where the U.S.A. already plays so great a part. . . . Through the Dominions British policy is ultimately tied up with the U.S.A. . . . This fundamental affinity coming from the past, stretching to the future, is or must be the real foundation of British Foreign Policy."

THE FUTURE

Though security based on armed forces may suffice the Empire for many years it will not last for ever. Armaments in the end breed suspicion and suspicion leads to war. Both in its own interests and those of humanity as a whole, the British Empire must give the world a lead in developing a new order in which war is no longer used as a means of settling international disputes. But any such new order must take full account of the limitations of human nature. The social development of mankind may have much to do with the peace which has long prevailed *within* civilized countries ; but the practical and effective means of maintaining that peace is the police. Only within the present Century has the social evolution of mankind reached the stage when it has sought means of establishing *world* peace. That peace will only be maintained by an international police force. The establishment of such a force and *then* the disarmament of individual nations should be our aim. This

might ultimately be achieved by a new League of Nations¹, but it will be sooner and more effectively achieved by Great Britain, the United States, Russia and China continuing to work with such strong and vital co-operation in time of peace as they achieved in war. Their armed forces which fought so successfully side by side might be amalgamated and thus police the world. Their desire for peace, prosperity and freedom for mankind could lead to the inclusion of all the peoples of the world into the ranks of the United Nations.

¹ It will be noted that this was written before the creation of the United Nations Organization.—EDITOR.

THE WORK OF THE ROYAL ENGINEERS IN NORTH-WEST EUROPE, 1944-45

By MAJOR-GENERAL SIR J. D. INGLIS, K.B.E., C.B., M.C.

On Wednesday, 19th December, 1945

LIEUTENANT-GENERAL SIR RONALD CHARLES, K.C.B., C.M.G., D.S.O., Chief Royal Engineer, in the Chair

THE CHAIRMAN : It is my great pleasure to introduce to this audience Major-General Sir Drummond Inglis, who is going to talk to us about R.E. work in the North-West theatre of Europe.

Major-General Inglis probably is better known to most of you than he is to me, because I am rather an old vintage ; but for those who have not had the pleasure of meeting him, I will say that he began this war as a C.R.E. He was quickly pushed up to be Chief Engineer of Home Forces. That body was merged into the 21st Army Group, and he remained as Chief Engineer. He went over with them to France, and has seen that particular operation through from the Normandy beaches right away to Hamburg.

LECTURE

I SUPPOSE that no operation of war can have had longer preparation than did the return to the Continent. I suppose also that I was exceptionally fortunate in being able to watch that preparation right from the very beginning, and see the thing through to the end. I propose, therefore, to tackle this lecture by giving you the Engineer story as I saw it right from the beginning. I hope you will forgive a rather long lecture ; it will not leave much time for questions.

EARLY STUDIES OF THE RETURN TO THE CONTINENT

One must go back to December, 1941, when the 1st Corps were given the task of studying the invasion of the Continent. The Headquarters Staff set off to Minley Manor where they spent two days studying an opposed landing. The site chosen was Narvik, because nobody had ever thought of anywhere else but Norway at that time. In consequence, this exercise bore no resemblance to the eventual operation, but I remember it for two reasons. In the first place, the beaches in Norway were all very steep, whereas one soon began to realize that any beaches which were not backed by cliffs on the coast of France or Belgium were likely to be anything but steep, in fact extremely shelving. This factor seemed likely to present a much more difficult engineer problem than the one we were faced with in that exercise. The problem of getting vehicles ashore dryshod on a shelving beach at that time seemed a difficult one and might well be an engineer problem. Although the Royal Navy later produced a few improved landing craft and various types of piers were tried, the problem was eventually solved by the waterproofing of vehicles, a really remarkable achievement by the Royal Electrical and Mechanical Engineers, and for the build-up by drying out landing craft on a falling tide. The second thing which I remember about that study period was the astonishment with which a proposal that bulldozers should be landed in the second flight of landing craft was greeted. This seems strange now, when one remembers that in Normandy on the front of one assault division alone ten armoured bulldozers landed with the assault and were followed by between twenty and thirty more during the next few hours.

The immediate effect of these thoughts on the nature of beaches was to point to the extreme need for a greatly strengthened Engineer intelligence organization in England to study at once the beaches of North-West Europe. At that time, there was literally no detailed information other than that from somewhat haphazard intelligence which had been collected by the Naval Intelligence Department and consisted largely of photographs of picnic parties on the beaches of Northern France. In the succeeding years this led to the building up of an Engineer intelligence section which produced, if not the perfect answer, a very fair one. The 1st Corps was soon to be disappointed, for it was only three months later that the study of the return to the Continent was made a secondary task and the 1st Corps was instructed to concentrate on the coming invasion of England by Germany. Nevertheless, these early thoughts on the subject undoubtedly produced results later.

One of the Engineer tasks connected with the return to the Continent was the construction of tunnelled Headquarters at Portsmouth, Plymouth and Dover. These were the work of Tunnelling Companies R.E. That at Portsmouth was the largest task and was eventually used as the Combined Headquarters both for the Dieppe raid and for the landing in Normandy. That at Plymouth was considerably curtailed, largely as a result of the sudden subsidence of a rose-bed in the garden of Admiralty House.

ENGINEER CONSIDERATION IN SELECTING THE POINT OF LANDING

Early in 1942, there was a combined Army, Navy and Air Force conference of high-ranking officers at which a young Sapper officer was given ten minutes in which to make an impassioned appeal that rapid airfield construction should be taken more seriously. I remember that Field-Marshal Montgomery came back from that conference greatly impressed, not only with the importance of the subject but with the way in which this young man had put it across. A very few days afterwards I was appointed Chief Engineer Home Forces, and one of the first jobs that I was given was to do something about rapid airfield construction. During that Summer we started to raise and train airfield construction groups. Our ideas on the subject were very misguided, and the groups were of a very different shape from those which actually took part in the Normandy landings. Nevertheless, they enabled us to work out a doctrine for handling them, and that doctrine, though it too evolved itself somewhat differently, did prove to be a very sound foundation.

This, of course, was only one part of the somewhat desultory preparations which we then started, and in the Summer of 1942 we suffered a further disappointment when a great part of the forces which we had been assembling and training were diverted to Operation "Torch," which was the code name for the landing in North Africa. Nevertheless, looking back on it, one realizes now the immense value which we acquired from the lessons of the North African and Sicily campaigns.

One of the greatest headaches in the early studies of the landing in Normandy was the question of the early establishment of the first airfields. At that time, the plan was to land on the beaches of the Cotentin Peninsula with the immediate object of capturing Cherbourg. Aeroplane photographs, however, showed that peninsula to be hilly in most parts and full of small fields separated by banks and hedges. In such country it would obviously be very difficult to guarantee the early completion of a large number of airfields. In fact, it would be extremely difficult even to select with any certainty potential sites for airfields. It was this factor which largely turned our eyes towards the beaches between Caen and Carentan. We had,

fortunately, long appreciated the importance of geology in modern war, and at that time had the services of Professor King, who had been with us since the beginning of the War and who in 1943 took up the Chair of Geology at Cambridge University. He was succeeded by Major Shotton who, having most ably seen us through the campaign, took up the Sorby Chair of Geology at Sheffield University. Amongst other extremely valuable advice Professor King pointed out that between Caen and Bayeux there was a patch of country which was not only gently undulating, but also possessed a top soil which was particularly suitable for airfields because of its excellent drainage qualities. This was, in fact, one of the main factors which led to the selection of the beaches eventually used. You will appreciate the importance of this factor when I tell you that the first landing strip for fighters was ready on D+1, and that by D+10 we had established four airfields; this number had increased to ten by D+25.

That it was possible to land on this piece of coast which was so far away from a port of any magnitude was due to the conception of the Mulberry or artificial port. This I suppose was the greatest civil engineering achievement of the war, and in itself is a subject for a lecture.¹ The Mulberry was developed by the Transportation branch of the War Office, which is a part of the Corps of Royal Engineers.

SPECIAL ENGINEER TRAINING AND THE ARMOURED R.E.

At the end of 1942, we recognized that certain field formations of Royal Engineers would not have time to be trained in all the branches of field engineering which we might encounter; and it was decided, therefore, that the field sappers of G.H.Q. Troops should to some extent specialize. About this time, the lesson of Stalingrad had made itself felt, and we realized that there was a terrific engineer task in the assault of such a fortress, and that a similar task would present itself in the assault, first of the coastal defences, and later of the rear defences of ports and of the Siegfried Line. Two formations of Engineers, each under their C.R.E. were therefore instructed to concentrate on training for the assault of highly developed positions with special reference to the coast defences. About this time, also, a number of curious devices such as Snakes, Flails, Rollers and Ploughs were being developed by the Anti-Tank Experimental Establishment. There was no organization to hold or operate these devices. Another young Sapper officer, realizing this, put forward a proposal for an armoured unit which would hold and operate devices of this sort. To cut a long story short, this proposal eventually materialized as the Armoured Brigade R.E. of the 79th Armoured Division. Two chemical warfare battalions, which had been converted to field companies and instructed to specialize in the assault, were hastily converted into what was then called Assault R.E. and later renamed Armoured R.E. Later, the Divisional Engineers of the 42nd Division, which at that time had been abolished, were added to form the 3rd Regiment of Assault R.E.

During the long period of waiting, another line of country was developed which later, during the crossings of the Seine, the Rhine and other big rivers, was to produce good dividends. Two indoor study periods were held at the School of Military Engineering at Ripon under the direction of the Engineer-in-Chief in which the *piece de resistance* was an opposed river crossing. The second of these periods studied an advance through Belgium to Antwerp and included the crossing of the Scheldt or Rupel immediately above Antwerp. This study disclosed the fact that we had never really seriously considered the crossing of such an obstacle, which was not only a very wide river but was tidal.

⁽¹⁾ See lecture on "The Prefabricated Harbour" by Rear-Admiral H. Hickling, C.B.E., D.S.O., in Journal of August, 1945.—Editor.

The immediate result of this study period was to start a training centre at Goole, on the Yorkshire Ouse, where field formations of Engineers could be trained in the crossing of tidal estuaries and very wide rivers. In all some five formations of R.E. underwent long periods of training at Goole, and each in turn developed new techniques of assaulting, rafting and bridging which proved of immense value in the crossings of the wide Continental rivers which I have mentioned. A great feature of all this training, both the indoor study periods and the training on the Ouse, was the participation of commanders and staffs and of units of other arms in the exercises. All this time the War Office, through the Ministry of Supply, were building up supplies of engineer stores and plant to meet the forecasts which we at Home Forces had made and were continually revising in accordance with the latest plans. At that time other theatres, particularly in the Mediterranean, had priority, and therefore the Engineer-in-Chief had to be very far-sighted in his orders for stores, in order to build up any reserve for us over and beyond the requirements of active theatres. At that time, of course, all planning above the actual landing came very much into the category of "star gazing," but it is quite interesting to look back now at the broad framework on which we based our bridging requirements. In detail, that framework was very wide of actual events, but the fact is that in total quantities it proved to be adequate and not so much in excess of requirements as to constitute an over-insurance.

BULK OIL INSTALLATIONS

In July 1942 it was decided that in order to save road transport petrol must be supplied in bulk by pipe lines and stored in bulk. It was the intention that petrol should be landed in this way from tankers and should be pumped forward along the Line of Communication with bulk storage tanks at intervals. It was decided that while the R.A.S.C. would be responsible for the detail issue of petrol and for operating the lorry and can-filling stations, the R.E. would be responsible for constructing the pipe lines and bulk storage tanks and for operating the pumps on the pipe lines. The main problems involved in this were to devise a method of constructing quickly, after a very brief reconnaissance, a ship-to-shore line across an open beach, and to train sufficient numbers of R.E. to do this and to lay pipe lines on land and erect the necessary pumping stations and tankage.

In accordance with well-established principles the Engineer-in-Chief decided that this must be done with normal types of Engineer units which should, however, receive special training. The first experiments in the construction of a ship-to-shore line were conducted at Westward Ho, but this location proved very unsatisfactory because the coast is so exposed there that the number of days on which no experiments were possible were excessive. It was soon recognized that without long preliminary preparations it was not practicable to lay a ship-to-shore line in such exposed waters. A new training area was, therefore, selected at Ryde in the Isle of Wight. Here the technique was developed and the necessary Artisan Works Companies and Electrical and Mechanical Platoons were trained, and last but not least the vast quantities of special stores required for this task were worked out and the necessary orders placed. This task was to prove one of great magnitude. As a record of achievement it can now be stated that the installation at the little port called Port En Bessin just North of Bayeux started to receive petrol on D+25 and by D+40 had acquired 11,800 tons of storage and had received 36,000 tons of petrol. You will see on Map 1 the oil pipe line shown in grey. That line does not, of course, represent a single pipe, but a number of six-inch pipes running side by side. Approximately 454 miles of oil pipe line were laid by the British alone in Normandy,

and later in the campaign a further 733 miles were laid linking the ports of Boulogne, Calais, Ostend, Ghent and Antwerp, and from there carrying petrol forward by pipe lines across the Meuse and the Rhine as far as Bocholt in Germany. This system was connected with the cross-Channel pipe line which, however, was not a responsibility of the Royal Engineers. The greater portion of the petrol taken into the system was, in fact, brought by tankers. The average receipts of bulk spirit into the system were 3,000 tons a day, but this rose to over 4,000 tons a day in February, 1945.

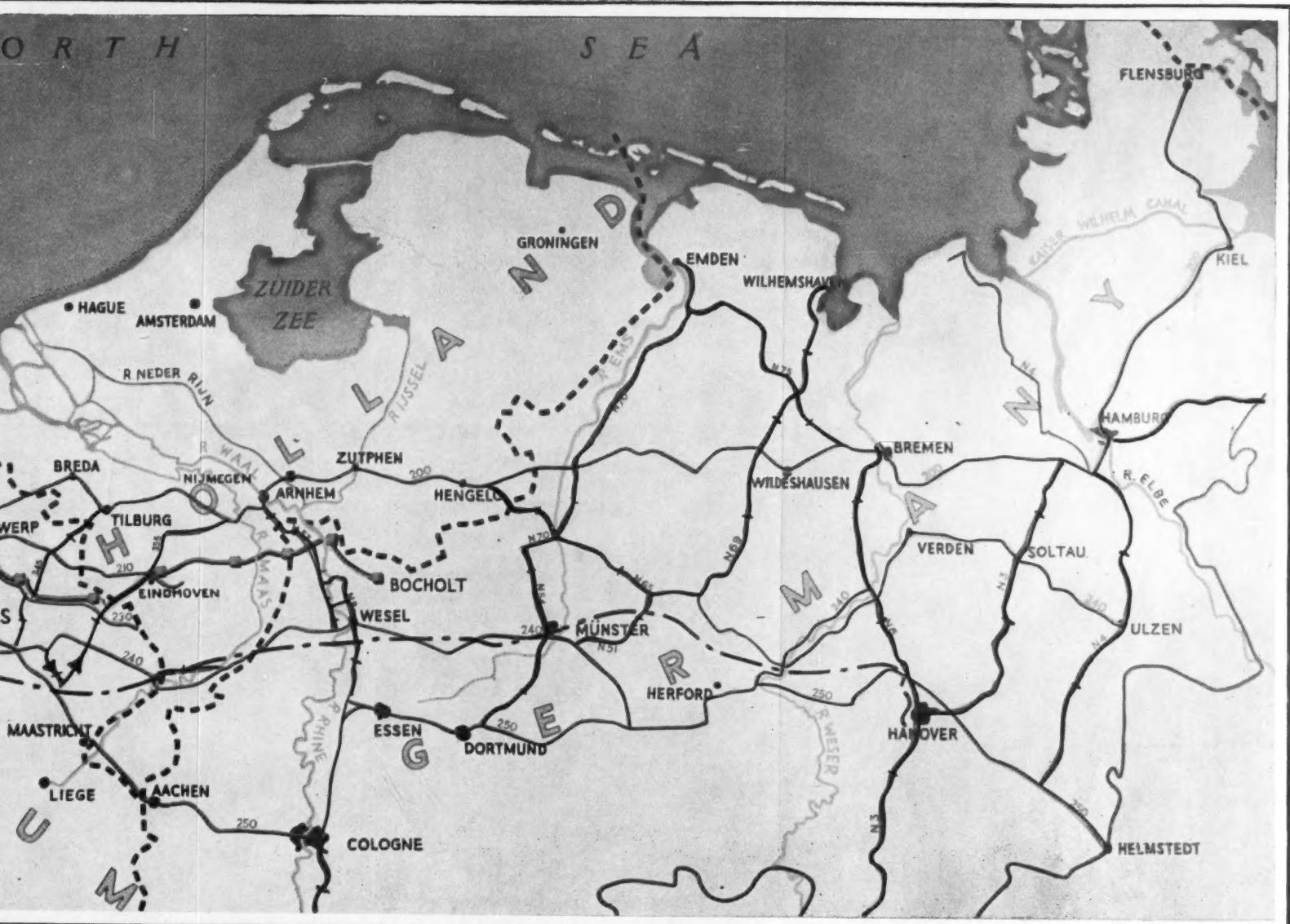
APPEARANCE OF BEACH OBSTACLES

Up to this point our efforts seemed very remote and academic, but the Dieppe raid had brought home to us the reality of the danger which might arise from the enemy defences and from adverse beach conditions. In October, 1943, the Engineer intelligence section, which by that time was producing vast quantities of information, aided by the geologist, produced a horrible threat in the form of a clay sub-soil and outcrops on the very beaches on which we intended to land. Fortunately, the geologist was able to point to a similar formation on a beach on the coast of Norfolk. It was, therefore, possible to initiate experiments there in methods of getting across such beaches. These experiments gathered momentum and came to include also methods of dealing with the various types of beach obstacle which the aeroplane photographs had disclosed.

In February, 1944, as a result of Rommel's appointment to the command of German Army Group B, there began to appear unpleasant-looking obstacles on the beaches of Belgium and France. As D-day approached, so the obstacles got thicker and thicker. Whereas originally there had been a single row, not very far below high water, the number of rows was now increasing and, as most of the obstacles were brought round from a neighbouring estuary by barge or landing craft, successive rows were placed lower and lower down the beach. We had always said that the way to tackle beach obstacles was to land when the tide was below them and tackle them dryshod. The notion of attacking under-water obstacles with elaborately trained and equipped teams of swimmers in face of the enemy was regarded unfavourably. The fact that an aeroplane bomb dropped into the sea at quite a distance from such swimmers would have much the same effect as fishing with a hand grenade was a sufficient discouragement to put this method right out of court. The account of these activities which appeared in one of the illustrated papers about six months ago was exaggerated. In fact, teams of swimmers were included in the assault force, but only as a safeguard to deal with obstacles which could not be tackled before the tide had submerged them.

Nevertheless, the gradual approach of successive lines of obstacles towards the low-tide mark gave rise not only to great anxiety, but to a series of conferences to determine H-hour to suit the opposing interests of the Air Force, who required a minimum period after first light to enable them to drop their bombs on the target, the Navy who required a minimum depth of water in order to bring their craft in over the rocks, and the Army who wanted a minimum time in which to deal with the beach obstacles before the tide submerged them. As we watched the obstacles growing farther and farther down the beach, so the period in which the requirements of the three Services could be met got narrower and narrower and finally disappeared altogether. It was then a question of a compromise. In the event, owing to an on-shore wind, the tide was higher than had been predicted, and the Sappers had a very unpleasant time trying to breach the obstacles when they were partly submerged.





OPERATIONS IN N.W. EUROPE 1944 - 45

MAP I.



The result was considerable damage to landing craft. Two main techniques were evolved for dealing with these obstacles, namely demolition with hand-placed charges and bodily removal by bulldozers which pulled the obstacles away and stacked them in suitable places on the beach.

DETAILED INTELLIGENCE OF THE BEACHES

During this study of the beaches and the obstacles, we were much exercised by the possibility that the Boche had contrived some form of land mine which would have a reasonable life on beaches. We were never able to obtain evidence that he had done so, but were never able to ignore the possibility, because it would be so easy to lay an embarrassing number of mines at the last moment should he succeed in guessing even approximately the D-day which had been selected. Moreover, a few months before D-day we did get an air photo showing the plumes of several under-water explosions evenly spaced which were thought to be part of a minefield exploding sympathetically with a bomb dropped near by. Many experiments were instituted to devise means of dealing with mines which might be encountered either just under water or just above water. Owing however to technical difficulties these experiments had to be abandoned.

This was done with some confidence because by that time a series of most daring reconnaissances had been carried out by volunteer R.E. officers and N.C.O.s who were put ashore by the Royal Navy from submarines and other special craft and taken off again on the completion of their reconnaissance. Of these detachments all returned safely except one, and they all reported that they had discovered no mines on the beaches other than those found tied to the tops of beach obstacles. The existence of these mines was also spotted in a magnificent series of low obliques taken a few weeks before D-day. Incidentally, these low obliques constituted a new departure in air photography for engineer reconnaissance. They were taken by American aircraft, fitted with forward facing and side facing cameras which were compensated for the speed of the aircraft. The photographs produced were sufficiently good to disclose these 75mm. shells adapted as land mines fixed to the top of wooden stakes on the beach. In the event, it turned out that the enemy had used practically no mines on the beaches themselves, but I am convinced that it is possible to devise suitable mines and moorings for use on beaches. Had the enemy put all the energy into devising and laying such mines that he devoted to his beach obstacles, the story of the Normandy landings would have been very different.

The study of beach gradients and tides to determine H-hour and to ascertain the conditions which were to be expected on the beach at the time of landing proved to be one of considerable difficulty. This arose from the fact that the Naval Hydrographers who originally assumed responsibility for producing the necessary data, while having very excellent and accurate information about ports and estuaries, very naturally had much less information about beaches. The Royal Navy supplemented this with a great deal of data obtained from large scale air photographs; but there were many unknown factors, and the results were not entirely satisfactory. Much of this work was carried out by Headquarters Combined Operations, who performed very valuable service in this connection. The American Army had appointed an Engineer officer to go into this question. He made a very accurate and detailed study of it with aeroplane photographs, and produced a rival set of figures. As far as I remember, the Admiralty in the end accepted these figures, but this occurred only at the last moment, and the existence of the two sets of figures usually produced at

Conferences by the opposing interests did not make decisions any easier. The lesson is that in waters where there is a wide tide range this is a matter which requires early and detailed study by one authority and one only.

THE APPROACH OF D-DAY

As D-day approached, the intensive detailed planning by the Second Army and by the 1st and 30th Corps with the Assault Divisions (3rd British Division, 3rd Canadian Division and 50th British Division) put a tremendous strain on Chief Engineers and C.R.E.s at these formations. Magnificent work was done getting out the loading tables for personnel and stores, vehicles and plant down to the last detail, and in carrying out exercises which not only served as a check on the arrangements which had been made but which helped to mystify the enemy as to the time and place of the invasion. The period of waiting was very tense, and the anxiety of the last twenty-four hours, when a postponement of twenty-four hours on account of bad weather had to be decided upon, must have been the last straw to many people. As far as Army Group Headquarters was concerned we had for some days shot our bolt and could not further influence the landing. Despite the tremendous confidence possessed by all under the leadership of the Commander-in-Chief, as far as the R.E. were concerned there was always lurking in the background of one's mind that horrible feeling that the enemy might spring a surprise upon us with mines on the beaches laid unknown to us during the last few weeks before D-day. To me, personally, and I am sure to many others who had been working on this plan for so many months, and who knew that the beaches had been selected as long ago as May, 1943, it seemed impossible that the secret had not leaked out. This danger of mines was, therefore, quite clearly a possibility, and it was one for which we had no universal cure but had to rely on the slow and cumbersome method of clearance by hand with mine detectors. It is true that we had flails to clear the initial gaps for the assaulting armoured fighting vehicles, but the problem of clearing the beaches to make way for the hordes of men and vehicles and craft which would shortly spread all over them would have been appalling. You can imagine the intense relief when at our Headquarters at Portsmouth at 9 o'clock on the morning of D-day we heard that we were ashore on all beaches and going strong.

DEVELOPMENT OF THE BEACHES

Looking back on our preparations afterwards, one felt that many of them had in the event proved unnecessary, but it would have been impossible to neglect these preparations without causing a lack of confidence in the troops who were to take part in this great undertaking. As it was, they went into the battle with tremendous confidence, in the knowledge that they had been given everything in the way of equipment that it was humanly possible to produce. The supply branches of the War Office and the Ministry of Supply itself deserve great credit for the way in which they fulfilled last minute requirements arising out of the growing obstacles on the beaches. To anyone who was privileged to visit those beaches during the first week of the invasion it was a tremendous thrill to see the terrific volume of shipping lying off the beach and the hordes of soldiers and vehicles streaming across them inland and others working away at their various tasks in the neighbourhood of the beach itself.

In this latter connection one must mention the construction of Naval Landing Pontoon Causeways for the dryshod landing of personnel and vehicles. One field formation of R.E. was allotted to this task and did a fine job of work both in

assembling the pontoons in Southampton Water prior to D-day and in erecting them on the beaches on the other side. There was much controversy as to whether these causeways were necessary or not. They were an insurance against the possible serious deterioration of the surface of the beaches owing to the clay sub-strata which I have already mentioned, and in addition were intended to enable vehicles to be landed from Landing Craft, Tanks, at all states of the tide. It must be remembered that up to D-day, it had been ruled that L.C.T.s could not be dried out and allowed to discharge their vehicles when the tide had receded. In practice, L.C.T.s had to be dried out, and the damage which occurred to them in consequence had to be tolerated. Later Landing Ships Tanks were also successfully beached despite predictions to the contrary. This contributed materially to the vehicle build-up.

I have already mentioned the artificial port. The story of this great conception is fairly well known. Construction was started on D+4, and by D+10 ships were unloading in the shelter afforded. On D+12 the first vehicles were landed on to the piers, and finally the port was handling as much as 7,000 tons per day of stores and 400 vehicles. The construction was much handicapped by the storm which broke on D+13 and lasted for three days. Severe damage was caused to the "phoenixes," which was the code name given to the enormous concrete breakwaters constructed in England, towed across the Channel and sunk in position off the town of Arromanches. The experience of that storm enabled the design of the "phoenixes" to be improved, and a further number with the improved design were installed later in order to protect the port against Winter gales in case we were confined West of the Seine during the Winter. It is interesting to note that those "phoenixes" of improved design are still standing. It is also of interest that "phoenixes" have been successfully used to close the final gaps in the breaches of the dykes on the island of Walcheren. This work, though carried out by the Dutch engineers, has been greatly energized and assisted by a small band of R.E. officers working under the Chief Engineer of Netherlands District who have earned the lasting gratitude of the Dutch people.

THE BUILD-UP IN THE BEACH-HEAD

Following the successful landing and establishment of the bridgehead, there came that long period of hard fighting and build-up in a very congested area in the British sector. The strategy of that operation has been described by the Commander-in-Chief in his lecture given in this room last October. From the R.E. point of view it was characterized by two things; one mines, and the other roads. Here we encountered the Schumine intermingled with Teller mines and half a dozen other forms of mines. The minefields laid by the enemy were supplemented by our own defensive minefields, for it must be remembered that on that left flank we were very much on the defensive at times. We learnt to our cost that it is not practicable accurately to record minefields laid at night in the face of the enemy. Such minefields may have to be laid, but if they are laid when our turn comes to advance, they may prove almost as great a menace as those of the enemy. The moral is that our own main minefield defence should, if possible, be laid in the rear of our forward defended localities where the work can be done preferably in daylight and be properly recorded.

I should think that most Sappers who worked in the Normandy bridgehead will have the word "roads" indelibly engraved on their hearts. The roads in that sector were a headache such as was never experienced in the American sector; they were always on the outer flank with much more "elbow room." By D+50 there were 150,000 vehicles in the bridgehead, which was then about twenty miles wide

and ten miles deep. At about this time, 18,000 vehicles were counted crossing a certain cross-roads in twenty-four hours. Every road worthy of the name was in use all the time, and it was practically never possible to close the road completely, and only with difficulty could some of them be limited to one-way traffic.

This experience proved one thing, and that was that we had much to learn about repairing roads under these conditions ; this lesson was repeated again and again throughout the campaign. We know now that, in the first place, we must devise some rapid means of repairing the haunches of roads while they are still under, at any rate, traffic in one direction. In the second place, we have learnt that we must have the organization and equipment to tar-spray and blind roads at great speed. Although it is good technical practice to repair pot-holes first and spray afterwards, our experience showed that the essential thing is to get the spraying done. The repair of pot-holes can come along afterwards.

The roads in North-West Europe which we took over from the enemy had been neglected for four years. They were all badly in need of tar or bitumen and were just ripe for breaking up under the heavy traffic which we imposed upon them. Early tar or bitumen spray, had we been organized for it, would have been a "stitch in time" ; as it was, the unfortunate Sappers and the Pioneer Companies working with them paid for it by many weeks of hard and uninteresting labour. It is not possible to show on the map all the roads repaired and constructed in the bridgehead owing to the small scale and those shown are the main routes maintained by the Army Group. Whenever a static situation developed, a vast network of roads, in addition to those shown, had to be maintained by Armies, Corps and Divisions.

In the first thirty days in the Normandy bridgehead, 35,000 tons of Engineer stores were landed—an average of 1,200 tons a day, but by D+90 this tonnage had increased to 172,000 tons—an average of 1,900 tons a day.

THE BREAK-OUT AND THE ADVANCE INTO BELGIUM

A few days before the break-out occurred, the General Staff became wildly optimistic about the probable speed of our advance. Their predictions as to our arrival at the Somme or even at the Albert Canal seemed at that time fantastic, and yet I think that even they were short of what actually occurred. The provision of bridging equipment up to and including the Seine had been well covered, but the requirements for these further advances presented a difficult problem to the Director of Works. He overcame the difficulty by organizing the wholesale picking up of bridges now left behind and scattered all over the L. of C. and, in conjunction with Q Movements, organizing a flexible programme of shipment of bridging equipment which could be brought in by small ships to successive ports as we moved eastwards along the coast.

The fact that our advance to the Albert Canal exceeded even the most optimistic estimates was of course largely due to the disorganization of the enemy, which fortunately caused a break-down in his demolition arrangements in Belgium. Nevertheless, between the Seine and the Albert Canal some 127 bridges were eventually built, and only in the Pas de Calais and the coastal belt of Belgium was our advance actually delayed by demolition. Map II. gives a good idea of the incidence of enemy demolitions. Each spot indicates a bridge rebuilt by the Sappers. The number of bridges destroyed by the enemy was, of course, far greater.

CROSSING OF THE RIVER SEINE

For the crossing of the River Seine two plans had been prepared, a deliberate crossing and a scramble. The scramble plan was put into effect in order to seize the advantage of the enemy's weakness on the East bank. In the case of one division the assault began ten hours after the arrival of the leading troops on the river. The lack of reconnaissance led to many errors and minor failures and there was some criticism, but the fact is that the crossing was completed with very few casualties. The assault was carried out on three divisional fronts and in all nineteen bridges were constructed by the British.

Although it had been decided that, owing to the tide and more particularly the tidal bore, no crossing would take place below Rouen, at the last moment, finding no opposition on the far bank, the 49th Division, collecting what equipment they could raise from other sectors, crossed in storm boats and rafts on the day on which the bore had been predicted and did in fact occur. In spite of great difficulties which were increased by the effects of the bore, 875 vehicles were ferried across the river where it is 750 feet wide, in the course of three days.

The story of airfield construction during this rapid advance from the bridgehead to Brussels is one of great achievement. During that period some thirty airfields, including twelve completely new runways, were brought into commission in a period of six weeks. Anyone who saw the aeroplane photographs of some of the remaining eighteen German airfields which had to be repaired and extended after our bombers had finished with them will realize that this was no mean task. Of the six Airfield Construction Groups which took part in these operations, two were Army Groups composed of R.E. and Pioneer Corps. The sixth was an R.A.F. Group working under R.E. control. A further four less mobile R.A.F. Airfield Construction Groups, worked under the Director of Works on the L. of C. carrying out the more permanent work of construction and accommodation for the R.A.F.

ARNHEM

The battle of the rivers known as Operation "Market Garden" started on 17th September, 1944, ten days after our arrival on the Albert Canal. Owing to the capture of Nijmegen bridge and the failure to hold Arnhem, the engineer work turned out to be less than had been expected. Nevertheless, a number of bridges were built, including a Bailey bridge on barges at Nijmegen.

The repair of airfields at Eindhoven and Volkel involved the Airfield Construction Group in some fighting which they greatly appreciated. That long and tenuous salient which one remembers so well on the Operations Room Map of the time meant that any arm, no matter what its task, was liable to find itself in the front line.

The plans of the Chief Engineer 30th Corps for this operation were of great interest. The successive crossings of some five canals, as well as the Maas, the Waal and the Neder Rijn, with all the permutations and combinations of what might occur if the bridges over those obstacles were or were not captured intact, presented the Chief Engineer with a pretty problem. An enormous bridging material depot was established by the Second Army at Bourg Leopold, which is the Aldershot of Belgium. Close to this town there was a fine expanse of sandy heath which provided an excellent area for this dump. The Chief Engineer 30th Corps organized his bridging on wheels in a number of columns so that he could call forward whichever column or columns suited the circumstances of the moment. The fact that there was only one main road up which the fighting troops and all their maintenance traffic had to pass greatly complicated the operation.

REHABILITATION OF COMMUNICATIONS IN BELGIUM

At this point the opening up of the railways requires mention. The railway had been carried forward from the beachhead to the River Seine, which was bridged by 21st September, twenty-six days after the crossing of the river, thus linking the beachhead with Brussels, Dieppe and Antwerp. The shortage of rolling stock and particularly of locomotives was the limiting factor in the use of rail transport.

During the comparatively static period which followed the Arnhem battle, engineer effort was devoted to opening up road, rail and canal communications which had been interrupted by the German demolitions in Belgium. These demolitions, apart from those in the coastal belt already referred to, were concentrated mainly in the area North of the Albert Canal. In these tasks, the Field Formation engineers and Transportation engineers co-operated, and one of the major problems was the replacement on canals of the low-level tactical bridges by high-level bridges with navigation spans. This involved considerable numbers of piled piers, the piles for which were obtained by Forestry Companies working in the Ardennes under the Director of Works. Throughout this time, also, the wear and tear on the roads was tremendous, and a great engineer effort was necessary to keep those roads going during the Winter. This problem was greatly aggravated by the long period of frost which occurred during December and the first half of January. Not only did this make work on the roads extremely difficult owing to their frozen state, but gave rise to considerable damage when the thaw occurred. This was not for want of foresight, because the lessons of the thaw damage from the previous war and in 1939 had not been forgotten ; but the regrouping to counter the German offensive in the Ardennes to which I shall refer later necessitated a number of operational moves just as the thaw occurred.

In the meantime, the Armoured R.E. had been gaining much experience and doing valuable work. In the Normandy bridgehead some costly lessons in the employment of this new arm were learnt. There was a tendency to employ them as fighting tanks, largely because with their gallantry and enthusiasm they were always ready to undertake any task. However, the lesson had been learnt, and they did excellent work in the capture of the rear defences of Havre, Boulogne and Calais ; particularly in the capture of Havre the co-operation between the Armoured R.E. and the Divisional Engineers was a model of what it should be.

PROTECTION OF BRIDGES BY BOOMS

I have not mentioned the successful attack by specially trained German swimmers on the bridges at Nijmegen. This happened almost immediately on the capture of Nijmegen. A team of about twelve Germans swam down the river with specially prepared charges that were capable of having their flotation adjusted by the compressed air bottles which they carried. It was evidently the intention to demolish both the road and railway bridges at Nijmegen. Fortunately, the charge on the road bridge failed to damage the pier and only succeeded in blowing off the decking from a portion of the roadway on either side of the pier. This was easily repaired. Had the pier been blown, the whole of the 800-foot centre span would have been dropped in the water. The attack on the railway bridge was highly successful. One of the temporary piers which had been erected by the Germans supporting the centre span was completely destroyed, dropping the centre span into the river.

This incident led to the provision at Nijmegen of a whole series of different types of booms varying from naval river nets down to balloon cables supported on jerry-cans. The problem soon became a vicious circle. The river nets were extremely

difficult to moor in the fast current of the Rhine and would not stand up to large quantities of debris carried down by the floods. It seemed necessary therefore to provide some kind of boom upstream to divert the debris. This boom in turn required protection against floating mines and so on. In the end the solution appeared to be large numbers of light booms made of balloon cables on jerry-cans, so that a series of mines coming down and exploding on the boom would not penetrate the defences before fresh booms could be strung to replace those cut. For the rest, patrol boats, searchlights and Bren-guns were provided to sink by fire any suspicious looking objects floating down the river. Fortunately for us the temperature of the water fell rapidly after the Nijmegen incident and produced conditions which no swimmer could stand. Had the campaign continued into the Summer we should have had to take special steps against swimmers. River nets may be the answer, but they cannot be replaced quickly should they be cut by explosives and the solution seems to be some kind of detection apparatus which will disclose the approaching swimmers who can then be dealt with by patrol boats with suitable depth charges.

The most tempting targets for the swimmers are undoubtedly the masonry piers of permanent bridges; these should be surrounded below water with masses of Dannert wire which will make it difficult for swimmers to place their charges. The possibility of ice conditions greatly complicates the boom problem. The only solution seems to be to remove all booms, except possibly the balloon cable type, as soon as ice conditions intervene.

THE GERMAN OFFENSIVE IN THE ARDENNES

In December the German offensive in the Ardennes diverted our attention for a few weeks. Considerable numbers of the Sappers of the 21st Army Group found themselves preparing for demolition the Meuse bridges between Namur and Maastricht. This was something that we had not expected, and a new factor soon appeared. A bomb dropped in the neighbourhood of one of the railway bridges being used by the Americans and detonated the demolition charges. This resulted in urgent requests from the Americans that we should remove all charges from the bridges. In the end, we compromised by removing detonators and ensuring that no detonators or cordtex was allowed to be within two feet of the charges. It is clear from this lesson that once the charges are connected up with detonators and cordtex there is a real danger that a splinter from a bomb striking one detonator may set off the whole system of inter-connected charges.

STUDY OF THE MEUSE AND RHINE

All through the Winter we made an intensive study of the Meuse and the Rhine. The three main conclusions from this study were, first, that icing conditions were liable to occur any time between December and the end of March, and that on the Rhine in particular they might prove very severe, so severe that no floating bridges could possibly stand. It was also evident that our plywood pontoons would not stand up to much less severe ice conditions, because even thin ice floating down the river would quickly cut through their thin wooden skins.

The second conclusion was that although the Winter and Spring months would see the end of the floods on the Meuse, severe flood might occur on the Rhine at almost any time in the year, certainly up to the end of June. It did seem, however, that March and April were slightly less subject to flood than other months. From the engineer point of view, therefore, the end of March was the best date for the assault.

crossing of the Rhine. The question of the assault of the Meuse did not arise because operations from Nijmegen and from the American sector East of Roermond would be able to pinch out that part of the Meuse still in enemy hands.

The third important conclusion drawn from our study of the Rhine was that, having failed to capture Arnhem and the island lying between the Waal and Neder Rijn, we had lost control of the Germans' ability to cause very serious flooding of that island. It was clear from this, therefore, that the original plan for entering Germany on the Nijmegen-Arnhem-Zutphen axis was no longer possible, and that we must seek for crossing places upstream from the point at which the easternmost arm of the Rhine Delta, namely the Ijssel, begins. The built-up area of the Ruhr was obviously to be avoided, and if the crossing was to be carried out by the 21st Army Group, crossing places must be found between the Ruhr and the Ijssel. This boiled down to Rheinberg, Wesel, Xanten, Rees, and Emmerich. Emmerich was ruled out as an assault crossing because it was overlooked from Hoch Elten.

True to form, the Rhine gradually rose in January and February and flooded the island between Nijmegen and Arnhem through the breaches made by the enemy in the dykes. He also flooded a considerable area just East of Nijmegen on the South bank of the Rhine.

At the end of February, within a month of the projected D-day for the Rhine crossing, a view of the valley from the neighbourhood of Nijmegen was indeed a depressing sight. The country was flooded eastwards almost as far as the eye could stretch, and one wondered, even if the floods were to subside, whether the flat ground on either side of the river would ever dry out sufficiently to allow the vast numbers of vehicles required for the crossing to deploy. However, once again the geologists proved right. The Rhine valley consisted of gravel covered with a clay loam which unfortunately at certain places was very thick, but the great thing was the gravel subsoil, and sure enough when the floods subsided at the end of February and a spell of dry windy weather intervened the ground dried rapidly.

ENGINEER WORK ON THE LINES OF COMMUNICATION

At this point, as one approaches the crossing of the Rhine which somehow everyone felt must be the climax of the campaign, it is opportune to look back at the work that was going on at the base and on the L. of C. At the risk of boring you I must give you figures to show the magnitude of the task which was carried out under the direction of the Director of Works, Major-General Tickell, now Engineer-in-Chief at the War Office. Under him the Forestry Companies felled a quarter of a million tons of timber. One fifth of this quantity was for pit props for the Belgian mines which would otherwise have had to close down with disastrous effects on the military forces based on that country. Enormous quantities of hutting were erected, and in order to give you some picture of this quantity I can say that it was equivalent to 180 miles of twenty-foot span. Of this, some thirty miles was manufactured locally. Two million tons of stone was quarried, and that stone was very nearly the life blood of the British Army during that Winter through rain and frost and thaw in an area congested between the boundary with the American sector on one side and the sea on the other. Twelve hundred miles of oil pipes were laid, including 330 high pressure pumps and 110 bulk storage tanks with a total capacity of 101,000 tons. These bulk oil installations alone consumed 97,000 tons of engineer stores. The total engineer stores imported were three quarters of a million tons, and this was in a period of eleven months. Some 25,000 items of engineer plant and machinery were imported and, in addition to the foregoing, local production of engineer stores

was carried out to the value of three and a quarter million pounds sterling. On the electricity supply side, 420 electric generators totalling 10,000 h.p. and 280 miles of overhead line were erected. Three thousand miles of insulated cable were installed.

As to airfields, including those in the Army area and those on the L. of C., a total of 125 airfields were constructed or repaired ; to give you an idea of what this means, the total area to be levelled, graded or repaired is equivalent to 2,000 miles of twenty-foot road. The area actually surfaced with some form of surfacing material was equivalent to 360 miles of graded road.

For the crossing of the Rhine, it was necessary to send forward to the Army Depots immediately West of the Rhine some 22,000 tons of Assault Bridging equipment. This included 2,500 pontoons, 650 storm boats, 2,000 assault boats, sixty river tugs, 650 outboard motors, 70 small tugs, 600 propulsion units and very large quantities of steel wire rope, blocks and tackles. The total length of steel wire rope for this operation was 260 miles, plus eighty miles of balloon cable. In addition to the foregoing, some 15,000 tons of bridging material was sent forward for the semi-permanent bridges which were required to replace the floating bridges, and for these some 250,000 items of special parts were manufactured locally in Belgium or in the Engineer Workshops. During the period from 8th December to 28th February, some twelve weeks, 203,000 tons of stone were sent forward to the Armies.

In November, operations had been continued to clear up the Germans remaining West of the Meuse. During this fighting, the Armoured R.E. did valuable work, particularly with their various forms of bridge laid by Armoured Vehicles, R.E. It was in this fighting that the Skid Bailey was first used and proved so successful. As its name implies, it comprised a Bailey bridge on skids which could be pulled and later pushed by A.V.s R.E. and so launched over gaps up to fifty feet. Here again the humdrum road work, which is so unspectacular but so important, was the greater part of the Sappers' task. The organization required to receive on rail and distribute the quantities of stone which I have just referred to, on roads most of which were nothing but country lanes carrying considerable quantities of day to day traffic, was no mean problem.

CLOSING ON THE RHINE

Early in February, Operations "Veritable" and "Grenade" opened with the First Canadian Army attacking eastwards from Nijmegen between the Meuse and the Rhine and the Ninth American Army attacking northwards from the Roer ; and once again the Sapper task was minefields and roads. The American attack was delayed about fourteen days by the Germans opening the Roer dam sluices. This involved the Chief Engineer, Ninth American Army in some nice calculations to predict the date by which the flood would have subsided sufficiently to permit a crossing. The road problem was particularly serious because, of the two main roads running East and West between the rivers, the most northerly was cut for several miles by the floods to which I have referred previously. For the regrouping for Operation "Veritable" fifty miles of new road, much of it corduroy, were built by the Sappers of the Canadian Army through the tracks in the Reichswald and a further 400 miles of road repaired, using 63,000 tons of stone. Very heavy fighting ensued, and this in itself played havoc with the roads which were later to become the main communications behind the assault of the Rhine.

The bridging of the Meuse had been proceeding all through the Winter, starting on the two flanks where both banks of the river were in our hands. Now, as the

whole of the East bank of the river was in our hands, it was possible to complete that task and provide all the bridges necessary for the support of the Rhine crossing. These bridges were the most varied in design and the most interesting bridges of the whole campaign. At the time of the Rhine crossing, there were in addition to the permanent bridge at Grave a total of three Class 70 and nine Class 40 bridges. These included two high-level Bailey bridges constructed on the piers of demolished railway bridges at Mook and Gennep. Prior to the construction of this bridge at Gennep, a Class 40 Pontoon bridge had been built there while the river was at the height of its flood. This bridge was 4,000 feet long, although the actual width of the normal river bed at that point was only 600 feet.

THE RHINE CROSSING

The crossing of the Rhine was carried out by the XVI American Corps on the right, which crossed on a two-division front, the 12th British Corps in the centre and the 30th British Corps on the left, both of which crossed on a front of one division. For this operation and for some four weeks before, the Second Army was reinforced with seven American Engineer Combat Battalions who worked under command of the Chief Engineer, Ninth American Army, but to the requirements of Chief Engineer, Second Army.

The assault was carried out with L.V.T.s (Landing Vehicles, Tracked), storm boats being used to carry the follow-up infantry. D.D. tanks (amphibious tanks) were sent across as soon as exits for them from the river had been reconnoitred. Class 50/60 raft ferries were constructed by the Armoured R.E. for the build-up of tanks. These ferries were operated by balloon winches. Class 12 Support Rafts were also provided for the build-up of vehicles until the bridges were opened. In the American sector Bailey pontoon rafts were used for tanks instead of Class 50/60 rafts. Initially, four bridges were provided in the American sector and four in the British sector, later five more were added in the American sector and five more in the British sector. Of these, two were so-called "all weather bridges," that is to say they were designed to deal with the maximum rise or fall of the river likely to occur.

Generally speaking, enemy resistance on the right was light, but increased steadily through the centre to the left, where the 30th Corps encountered heavy opposition during the first thirty-six hours. The assault took place at various times according to the Corps front, between 9 p.m. and 2 a.m. Airborne landings followed at 10 a.m. On the 30th Corps front, attempts were made during the following day to establish rafts, but the town of Rees on the far bank of the river still held out, and the accuracy of the enemy artillery fire which came down whenever an attempt was made to operate rafts showed clearly that they had observers in the buildings of Rees which overlooked the West bank along practically the whole of the Corps frontage. The Chief Engineer of the 30th Corps asked his Commander whether he should press on with the establishment of raft ferries regardless of casualties, but the Commander was prepared to accept a delay because the infantry and D.D. tanks which had already crossed were firmly established and making slow though steady progress. As soon as Emmerich had been captured by troops crossing at Rees, a further two bridges were established there by the Canadian Army in preparation for their drive westwards to the Ijssel, which they crossed at Deventer and in the neighbourhood of Westervoort, providing bridges at both places and later at Zutphen. In this way, Arnhem was eventually captured from the East and two pontoon bridges were constructed there across the Neder Rijn.

FINAL STAGES

It had been decided that semi-permanent bridges on piled piers were to be constructed, starting about fourteen days after D-day with a target of six weeks for completion. It was appreciated that this six weeks might have to be extended up to as much as ten weeks, particularly if river conditions were unfavourable. It was originally intended to provide two-way bridges of this type at Wesel, Xanten, Rees, Emmerich and Arnhem, the latter being continued by a further two-way bridge across the IJssel at Zutphen. The bridge at Wesel was to be the task of the American Ninth Army. Very soon after the actual crossing, however, it became evident that German resistance was weakening. It was, therefore, decided not to proceed with the bridge at Emmerich and to reduce the bridge at Xanten to one-way. The bridges at Rees and Xanten were eventually completed in approximately seven weeks. The additional week above the target was accounted for by the fact that some of the Bailey equipment which had been provided for them had to be diverted to the Second Army who were at that time approaching the River Elbe, having once again advanced at a speed far in excess of anything that had been anticipated.

It had been feared that the Germans would again make good use of mines on the East bank of the Rhine. It was felt that the sector in which the crossings were to be made must be fairly obvious to them and that within that sector the actual points of crossing could be narrowed down to comparatively small frontages. However, observation from our own bank prior to D-day disclosed little enemy activity, and in fact very few mines were encountered. From this time onwards the disorganization of the German Army seems to have prevented the enemy from arranging a supply of mines, as very few were encountered between the Rhine and the Elbe. His demolitions, on the contrary, increased enormously. Undoubtedly, the fact that he was ordered to stand and fight greatly simplified his demolition problem. There was no question of deferred or final demolitions waiting until his own troops had been withdrawn across them. Local commanders indulged in an orgy of demolitions and blew up every bridge they could find. The figure of 508 bridges constructed by the 21st Army Group between the Rhine and the Elbe is a small indication only of the destruction which the Germans brought to their own country, forming as it does a high proportion of the total of 1525 bridges constructed during the whole eleven months of the campaign. Map II shows this point very clearly.

By the time that the leading troops were approaching the River Elbe the bridging supply problem was becoming serious, not so much in regard to the quantity of bridging available in the theatre, but owing to the problem of carrying it forward from the railheads West of the Rhine. As things turned out, with the collapse of the German Army and the rapid advance to the Elbe, it would undoubtedly have been better to reinforce the Railway Construction Troops of the Transportation branch with Field Sappers in order to speed up the establishment of the railway eastwards across the Rhine and the Weser, instead of employing Port Construction Groups of the Transportation branch to reinforce the Field Sappers on the construction of the semi-permanent road bridges across the Rhine. As we approached the Elbe we were studying the problem of bridging up through Schleswig-Holstein and Denmark. By this time the Second Army, being faced with the problem of carrying everything forward by road, had necessarily become very economical in their number of forward routes, and there is no doubt that the bridging supply would have lasted. Nevertheless, we were just beginning to get anxious when, about a week before the

end, the Chief of Staff told me one day that he was extremely optimistic and that in his opinion the Boche had "had it." In less than a week the end had come and all anxieties had ceased.

ROYAL SIGNALS

Some mention should be made of the extent to which R.E. activities are dependent on efficient communications. Planning and prior reconnaissance play an important part in R.E. work, and to assist in these matters Royal Signals sections have been provided in a complete chain from the Chief Engineer at Army headquarters down to the reconnaissance parties at bridging sites, etc. For major assaults on water obstacles a special Signals layout was always provided to meet the particular requirements of the occasion. None of this organization existed before the War, and its importance as a major lesson therefore needs stressing.

Railway operating would be impossible without the Royal Signals companies permanently attached to railway operating groups to provide line facilities.

An important lesson, emphasized by this campaign, is the need for the closest liaison between the Royal Engineers and the Royal Signals, in order to minimize the amount of damage caused to communications through R.E. work. Until such liaison became an established principle, damage was on a vast scale, far greater than from any enemy efforts. In particular, airfield construction, road repairing and demolitions of all kinds were causes of much anxiety to the Royal Signals. Bulldozers appear to have a natural instinct for finding and cutting cables, particularly the multi-core variety carrying main communication arteries.

THE ACTIVITIES OF TRANSPORTATION

In his lecture in October the Commander-in-Chief said that his planned operations were never held up even for a single day by any lack of administrative resources. This extremely satisfactory state of affairs must be attributed as much to the R.E. Movement Control Staff and the R.E. Transportation Service as to the other administrative staffs and services. The whole story of their preparations and of the problems they encountered would take as long to tell you as my lecture this afternoon, and although the thread of their activities runs through my talk, I cannot conclude without a summary of their work.

The Transportation Service, in addition to the prominent part they played in the construction and operation of Mulberry, had the responsibility of restoring and operating the railways, canals and ports of the liberated countries and later, in occupied territory, to meet the maintenance requirements not only of the 21st Army Group, but also to a certain extent of the American Armies on our right. The rapid advance to the Seine and beyond demanded improvisation of rail facilities to meet the ever increasing requirements along an L. of C. which lengthened daily. During this period the French railway system was disorganized, yards were demolished and bridges blown. Yet a bridge was constructed across the Seine at Le Manoir in eighteen days and a skeleton rail service East of the Seine was rapidly developed and extended. Concurrently with this, the Channel ports were being opened up. Later, as the situation stabilized, Transportation was faced with the enormous task of rehabilitating the railways and waterways in the Low Countries. The latter was a particularly formidable job. Yet the rail traffic increased as the Winter drew on, supplemented more and more by canals; and the growing demands for the maintenance of the Armies and for the essential internal economy of the Low Countries were met.

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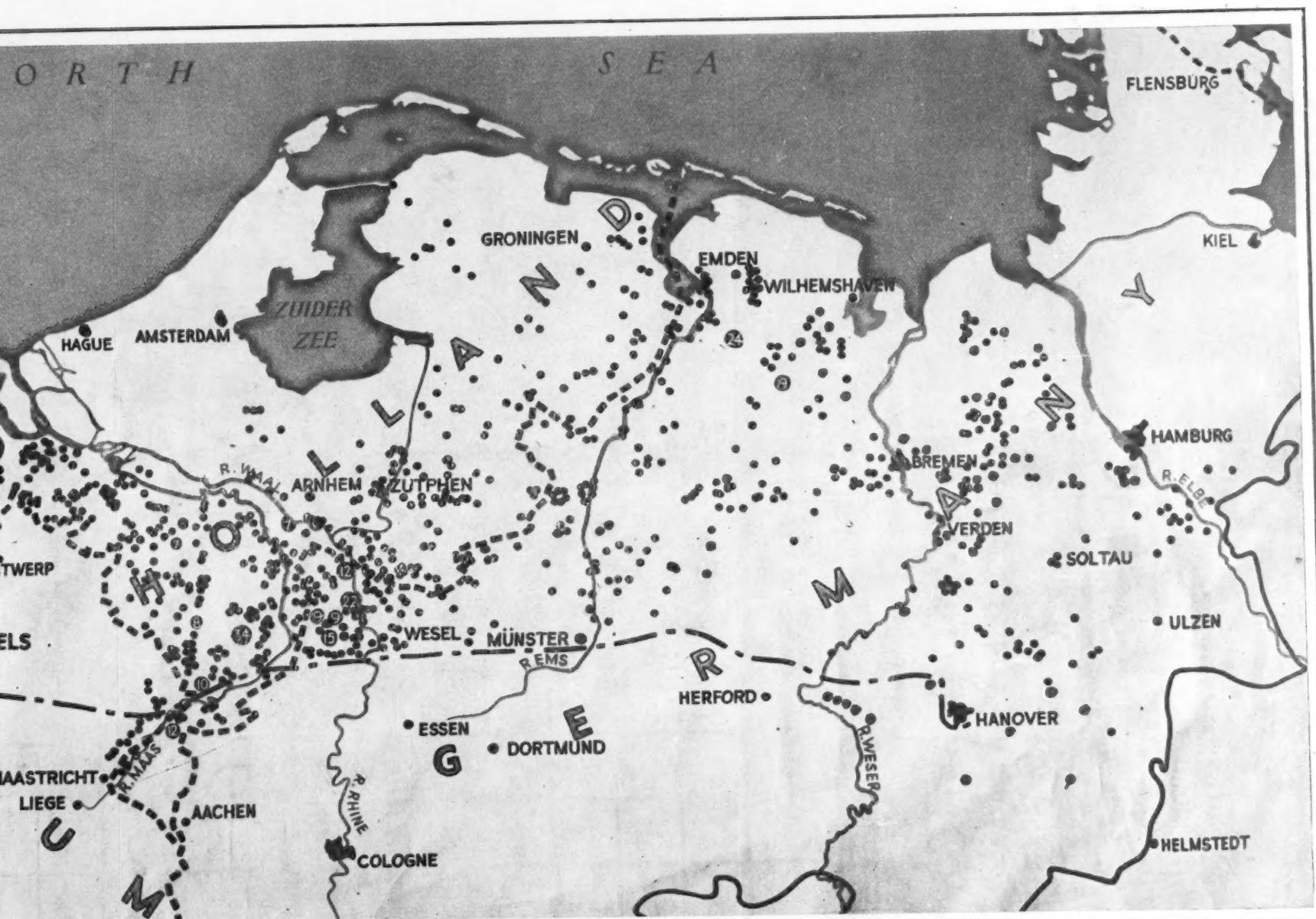
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MAP II



The development of Ostend, Antwerp and Ghent to receive the heavy tonnages for maintenance during the Winter was up to programme, and it is interesting to note that in every case ports were ready to discharge and clear cargo before seaward access by minesweeping could actually be obtained.

As the campaign stabilized, the extent of demolition over the transport systems increased and there were requirements for new rail bridges over nearly all the major water crossings of the trunk lines in South Holland and Belgium. Concurrently with the programme for construction of road bridges across the Rhine we planned a rail bridge at Spyck near Emmerich. There was a spur leading to the site selected, but the whole project had to be planned in the dark for a place at which no railway bridge had previously existed. This bridge was completed ahead of its scheduled date. It took one month, the first pile being driven by the Quartermaster-General on 9th April and the bridge being open for traffic on 9th May. Although it did not contribute towards the maintenance of the Armies during the campaign, it has been vital in achieving the rapid build-up of stores necessary in Germany for the maintenance of the occupational force.

I think that the work of the R.E. in Movement and Transportation spheres during the campaign will be best summarized by giving you a few figures. At the height of the Winter there were some 35,000 of all ranks employed, and during the campaign some 7,000 miles of railway lines and 900 miles of canals were opened for traffic. Over 1,000 locomotives and over 3,000 wagons were imported and some 2,700 locomotives and 4,200 wagons were repaired. Ninety-one railway bridges were rebuilt, involving a total length of over three miles of bridge work.

WORK OF R.E. SURVEY

I cannot conclude this lecture without reference to the Survey branch of the Corps of Royal Engineers.

From the very early stages of planning, the Survey units which were on the "Overlord" Order of Battle were engaged in printing, under conditions of highest security, many special maps required for planning, e.g. Overprints of enemy defences, Intelligence maps, Tank Going maps, "bogus" maps for briefing, as well as large quantities of normal maps for the operation. Assistance was also given to Counter Battery Officers and Air Photographic Intelligence Section interpreters in plotting the grid co-ordinates of enemy targets from air photographs. All this had to be done while the Survey units were preparing themselves—training, mobilizing, waterproofing vehicles—for the campaign, in which they, in effect, started to operate some four months before D-day. The second major Survey task before the assault was the complete organization of map distribution to the assault and follow-up formations. This necessitated a widespread system of map depots in concentration and assembly areas; these were provided by Home Forces, but organized and controlled by the 21st Army Group. The matter was much complicated by the paramount need for security; and arrangements had to be made, by a system of sealing and use of a code, to ensure that the right maps were issued without the map depots or the recipients knowing what those maps were.

Ten tons of maps, to allow for switching of divisions, were landed on D-day. Other map stocks followed rapidly, with the loss of only one ten-ton lorry load. Map distribution in Normandy proceeded smoothly, though the nature of the country produced demands for the large scale (1/25,000) map far in excess of War Office authorized scales. These were printed in the field and supplied. The triangulation

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data available for Normandy was known to be unreliable. Topographical Survey Troops were therefore sent over at an early stage of the assault and were continuously engaged on the provision of a reliable trigonometrical control for Survey Regiments R.A. until the break-through occurred after Falaise.

After the break-out from the bridgehead, operations moved quickly and the major Survey problem became map production and distribution. Although printing had been carried out of areas well ahead and astride the planned axis of advance, a shortage of maps began to be felt, and the difficulty of transporting the right maps from bases in Normandy was acute. Arrangements were made for daily deliveries by air from the United Kingdom to Belgium, and the situation was put right.

During the Winter in Holland, map stocks of Germany were built up ready for the advance across the Meuse and Rhine. Advantage was taken of the static conditions to revise from air photographs and bring up to date the existing large-scale maps of Germany. In addition special extra large-scale maps (1/12,500) were prepared along the Meuse and the Rhine, and for the attack on the Dutch Islands. Field survey was carried out for Artillery along the whole front under most difficult conditions of intense cold and very poor visibility. One task which calls for special mention was the survey carried out at great speed for the location of the many radar stations erected in Belgium and Holland as defence against the V.1 attacks.

The German counter-offensive in the Ardennes necessitated very rapid printing of a large number of maps, especially 1/25,000 (which cannot, owing to their numbers, be held in stock for areas where formations are not planned to go), and some extremely urgent map distribution. Trigonometrical survey was carried out, co-ordinated with Survey Regiments R.A., to cover the planned defensive position along the River Dyle. This was finished in time for Topographical Section to go forward and provide trigonometrical control for the Artillery in the British counter-offensive.

The Rhine battle was preceded by provision of trigonometrical survey control for Artillery along the whole front; and in addition over forty points were fixed on the enemy side of the river. Survey Company R.E. provided two Topographic Sections for survey of the bridging site at Xanten and Rees, and also a few surveyors to help during the construction of the permanent bridges.

The biggest Survey problem during the whole of the campaign was map printing and distribution, the main difficulty being to transport the right maps forward fast enough. A very delicate balance has to be struck between printing too far ahead (and so increasing the load to be carried forward) and printing too late to get the lighter load forward in time. In addition, however, R.E. Survey units were fully employed on field survey and air photo survey.

RETROSPECT

Looking back on this campaign from the viewpoint of Chief Engineer, I think there are certain high lights which stand out.

First, I am convinced that the peace time education of the young Sapper officer has been an outstanding success. The background given by the mixture of military and academic education at the School of Military Engineering and Cambridge has produced a type of officer who, with a properly directed subsequent career, is quite first-class. But the proper direction of the subsequent career is very, very important. The second high light was the magnificent support which we received from the War

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Office and the Ministry of Supply in the form of an abundance of first-class equipment and materials. I would underline the achievements of the Experimental Bridging Establishment at Christchurch—an example of a successful experimental establishment run throughout the years of peace by the Army. Outstanding amongst these was, of course, the Bailey Bridge named after Mr. Bailey, a civilian member of the staff of that establishment to whom the chief credit for the design is due.

Finally I wish to pay tribute to all ranks of the Corps of Royal Engineers who took part in the campaign. Some of them were fortunate enough to work on spectacular tasks such as the Rhine bridges and to be personally congratulated on their work by the Commander-in-Chief or by their formation Commander. Others, less fortunate, were employed wholly on unspectacular work such as road repairing or on some obscure task tucked away on the L. of C. Their work was no less important and no less appreciated by me as Chief Engineer and, to my personal knowledge, by all formation commanders from Field-Marshal Montgomery downwards.

DISCUSSION

MAJOR-GENERAL K. RAY: Of those 125 airfields constructed, I would like to ask how many were of all-weather construction?

THE LECTURER: I am afraid I just do not know. The majority of them, of course, were not all-weather; they were either just plain earth runways or else they were square mesh or Somerfeld track; and a number of them were Prebitumenized Hessian Strip. Later on the Director of Works developed quite a lot of all-weather airfields, but I am afraid I do not know the number.

THE CHAIRMAN

I hardly know where to begin, but if you would excuse one personal experience which is, I think, rather to the point, I should like to say that some thirty-six years ago I put in one month voluntarily (with no pay) at the War Office, being on leave from India at the time; the job I was given to do was to edit the draft and produce the first proof of the first edition ever of "Engineer Training." I worked on it very hard, and I produced what I thought was something rather useful, and handed this in to the then Director of Staff Duties, who returned it to me with the remark: "This book gives an exaggerated idea of the importance of Engineers in warfare." That was a slight damper to a young officer who also, incidentally, was a Sapper.

However, with that personal experience, I should like to say to General Inglis what an intensely interesting lecture he has just delivered. It has filled me with amazement at the way in which he, as the Chief Engineer who controlled all these very remarkable achievements prior to the landing on the Normandy beaches and subsequently the whole way through to the eventual defeat of the Germans, carried out the multifarious duties which helped to make victory possible.

It is impossible to sum up a lecture of this type, and many of you did take an actual part in the operation. My own efforts were limited to endeavours to get out to the theatre of war, which were, very properly, turned down by the Commander-in-Chief; but I think I may, on your behalf, say that we have listened to a very remarkable story of what our brother officers and men in the Corps have done in the defeat of the Germans, that the story has been placed before us with a remarkable lucidity and in such a way that we have been able to follow clearly the many different operations and activities of our Corps over which General Inglis presided with such outstanding success.

The customary votes of thanks to the Lecturer and Chairman were carried by acclamation.

SUPREME COMMAND

By BRIGADIER W. G. S. THOMPSON, O.B.E., Indian Army

I HAVE recently been a member of a committee charged with the task of reporting on one particular application of Supreme Command. During its work the committee toured extensively and met many senior officers who were, or had been, closely connected with the working of Supreme Command in South-East Asia, North Africa and North-West Europe, and also of the military side of the War Cabinet Secretariat in Whitehall. We therefore had a unique opportunity of picking the brains of those with first-hand knowledge of the working of a Supreme Headquarters and of an inter-Service staff, and, although the organization of the various headquarters varied considerably in detail, it soon became apparent that there were certain principles which were common to all. The paper that follows is an attempt to define these principles and to suggest in outline the form which an organization for Supreme Headquarters might take in the future. While it is based on data collected by the committee, it is in no way connected with the report of the committee, nor does it necessarily represent the views of any members of the committee other than myself.

PART I. PRINCIPLES OF SUPREME COMMAND

The extreme flexibility of air power, coupled with the modern trend of weapon development in general, has made close co-operation between the fighting Services even more important than was the case heretofore.

It is primarily this interdependence between the fighting Services that has led to the introduction of Supreme Commanders within defined theatres of operations in the recent war. The functions of a Supreme Commander have, as regards the British Commonwealth, gradually evolved from the time of the appointment of Air Chief Marshal Sir Robert Brooke-Popham as co-ordinator in the Far East, before the war with Japan, down to the present. The organization adopted has varied considerably, according to circumstances. Admiral Lord Louis Mountbatten in South-East Asia had under him three Commanders-in-Chief, one each for the Navy, Army and Air Force respectively, although the extent to which the Naval C.-in-C. was under his orders was strictly limited to exclude responsibility for the protection of trade routes within the limits of his sphere of operations. General Eisenhower in North-West Europe, on the other hand, with very much larger forces under his command, dealt directly with the commanders of up to four army groups and one naval C.-in-C., while controlling the various air forces under his command first through an A.O.C.-in-C., the late Air Chief Marshal Sir Trafford Leigh-Mallory, and later through his Deputy Supreme Commander, Marshal of the R.A.F., Lord Tedder, who in addition was responsible for arranging the co-operation of the strategical air forces which were not under General Eisenhower's command. In each case the organization was devised to meet the needs of the particular theatre, and it is immediately apparent that the organization for Supreme Command must vary from case to case and that no stereotyped organization to meet all cases is either practicable or desirable.

While accepting the fact that the organization for Supreme Command must vary from case to case in detail, it is of interest to consider what principles have emerged in the recent war which are common to all and which may be applicable to similar organizations in the future.

ADVANTAGE OF HAVING A SUPREME COMMANDER

The advantage to be gained from the appointment of a Supreme Commander is, obviously, to have one man who can make a decision as to how the available armed forces in a theatre of operations can best be used for the defeat of the enemy, and who can influence the employment of those armed forces to that end with the minimum of dispersion of effort. For this he must be a commander in fact, ultimately responsible to the Chiefs of Staff, or to whatever authority appointed him, for the employment of the armed forces under him. This is the fundamental difference between a Supreme Commander and separate Service Cs.-in-C. in the field, who are responsible to, and receive instructions from, the head of their own Service, and who have control in battle, and in the preparations for battle, only of their own Service.

This is not to imply that the system of equal Commanders-in-Chief is so basically unsound that it will never produce satisfactory results. The whole of the Middle East Campaign, including the culminating victory of Alamein, was fought under this system. It does, however, appear on the face of things that the system of a triumvirate of independent Cs.-in-C. is more dependent on a correct admixture of personalities than is either necessary for success or desirable.

The desirability of appointing a Supreme Commander for a specific theatre of operations increases with the complexity of the local problems and with the distance of the theatre away from the location of the ultimate controlling authority, in our case the Ministry of Defence and the Chiefs of Staff in Whitehall, with a corresponding lessening of the control which the latter can maintain. From being desirable when only British Commonwealth forces are concerned, the appointment of a Supreme Commander appears to become essential when the armed forces in a theatre include considerable forces of our Allies, if real integration of effort is to be achieved.

FUNCTIONS OF A SUPREME COMMANDER

The functions of a Supreme Commander should be to decide on the plan of campaign and to co-ordinate effort towards its successful completion. He will also need to define broad policy on questions, which are likely to be mainly administrative, affecting more than one service. He should not become involved in the detailed affairs of any of the three Services under him. To do so duplicates effort and implicates him in matters which should be the concern of his Service Cs.-in-C. In its simplest form, the organization of supreme command consists of a Supreme Commander and three co-equal Service Cs.-in-C. under him, each executively responsible for the functioning of his own Service. The size of the forces concerned or the geographical nature of the theatre of operations may, however, make it necessary for the Supreme Commander to deal with more than one C.-in-C. of a particular Service, as happened in the case of the land forces in North-West Europe. General Eisenhower has declared his conviction that there is no room for a commander between the Supreme Commander and his Army Group Commanders (see report on the lecture by Lieut.-General Bedell Smith on "Problems at an Integrated Headquarters" published in the JOURNAL for November, 1945) because, primarily, the commander immediately senior to the Army Group Commanders must be the man who controls the air forces. The interpolation of a commander and staff for the whole of the land forces where they consist of more than one Army Group would merely mean another link in the chain of command with a consequent lessening of intimate contact between the land and the air forces and delay in the provision of air forces for close co-operation.

with the land forces when needed at short notice. In the future it may be that in certain circumstances the same may apply to the command of naval forces, and even possibly of air forces, although the great flexibility of the latter makes this, in the light of present experience, unlikely. In any case, the number of Service Cs.-in-C. under a Supreme Commander does not alter the principle that the latter should not be concerned with service detail.

Each Service C.-in-C., however many of them there may be, must therefore have adequate powers, including financial powers, given to him to make reference to the Supreme Commander unnecessary except on major matters of policy.

POSITION OF THE SERVICE CS.-IN-C.

Although the Supreme Commander is ultimately responsible for all operations and all the armed forces employed in his theatre of operations, the Service Cs.-in-C. are responsible for the execution of his directions and orders by their Services. They must therefore be responsible for advising the Supreme Commander whether or not his plans are practicable and can be carried out by their respective Services. From this it follows that advice to the Supreme Commander on matters for which the Cs.-in-C. are executively responsible must come only from the Cs.-in-C. An organization under which the Supreme Commander can get his advice on such matters from his staff as well as from the Cs.-in-C. is fundamentally wrong. It has been the cause in the recent war, on more than one occasion, of friction and even failure. Hitler's O.K.W. is an outstanding example of an organization set up to give advice without executive responsibility, and although in this case the evil of the organization was probably intensified by the special circumstances of suspicion between Hitler and the German Army Command, the organization of the O.K.W. undoubtedly played no small part in bringing about Germany's defeat.

JOINT PLANNING STAFF

The problem of Joint Planning Staffs has already been the subject of an article by Lieut.-Colonel G. P. D. Blacker, C.B.E., R.A., in the last (February, 1946) issue of the JOURNAL. In it, he discusses the merits and demerits of the Joint Planners being on the staff of the Supreme Commander or drawn from the staffs of the Service Cs.-in-C., to whom they remain individually responsible while having a collective responsibility to the Supreme Commander. Although Lieut.-Colonel Blacker says in summing up that it is impossible to express a definite opinion as to which system is best, it seems to the present writer that the arguments weigh heavily in favour of the Joint Planners being drawn from the staffs of the Service Cs.-in-C.

Lieut.-Colonel Blacker very rightly points out that there should be only one set of planners dealing with one problem. Yet if there is a set of Joint Planners working out future plans for the Supreme Commander, and each C.-in-C. has his own planners working out present plans, there comes a time when the "future" turns into the "present," and the joint plans prepared by the Supreme Commander's planners, and approved by him, are turned over to the Service C.-in-C. for execution. It is at that stage that difficulties, previously unforeseen, will come to light if the Supreme Commander's planners have not throughout been in the very closest touch with the staffs of the Service Cs.-in-C. Surely the best way to avoid this difficulty is for one set of planners, drawn from the staffs of the Cs.-in-C. and thus in the closest touch with the rest of their staffs, to handle the problem throughout.

Experience in North Africa and South-East Asia bears this out. In both these theatres the Supreme Commanders started with joint planning staffs of their own

quite separate from the planning staffs of their Service Cs.-in-C.; and in both cases they changed very soon to a new organization under which their joint planning staffs were drawn from the planning staffs of their Service Cs.-in-C. They found that in practice their first organization was unsound and did not work because their joint planners could not keep in sufficiently close touch with the staffs at the various Services headquarters to ensure that the plans which they produced were practicable. They were in effect a planning staff without executive responsibility, as was the German O.K.W.

The second system evolved whereby the planners have a dual responsibility, individually to their own Cs.-in-C. and collectively to the Supreme Commander, is similar to that in use in Whitehall, where the Directors of Plans at the three Service Ministries jointly prepare and submit plans to the Chiefs of Staff. It is a system which has worked well both in Whitehall and in operational theatres, and seems the most satisfactory system so far devised. It works equally well for administrative planning, which is an essential part of the joint planning organization.

The above system assumes only one C.-in-C. to each Service under the Supreme Commander. Where there are more than one to any one Service the system needs some modification. If there are, say, three Army Group Commanders under the Supreme Commander and each is represented by his Director of Plans on the joint planning staff, the Army will have three times the representation of the Navy and Air Force and the Joint Directors of Plans' committee will have grown somewhat large and unwieldy. In such a case it would seem to be preferable to keep the committee small and Service representation equal by having an Army Director of Plans, with the necessary assistants, on the staff of Supreme Headquarters, with a representative of each Army Group Commander attached as a member of the Joint Planning Staff under him. It would then be his responsibility to obtain the agreement of all Army Group Commanders to the practicability of all plans before submission to the Supreme Commander, using the representatives of the army groups on the J.P.S. for this purpose, and also to obtain for the J.P.S. information needed from the army groups.

FUNCTIONS OF THE SUPREME COMMANDER

The Supreme Commander should, as has already been mentioned, be kept free of detail so that he can have ample time to devote to the consideration of policy and strategy. Details concerning each particular Service should be left to the respective Cs.-in-C. There are, however, certain functions, such for example as political warfare and deception plans, which do not rightly belong to any particular Service, and these should, in so far as they are the concern of the armed forces, be under the executive control of the Supreme Commander. Furthermore, there are certain functions and services which are common to all three fighting Services and for which a case can be made for integration under the executive control of the Supreme Commander on the grounds of increased efficiency and economy of effort. On the other hand, the more functions and services which are directly controlled by the Supreme Commander, the more will he inevitably be involved in detail. Only, therefore, where the advantages are real and indisputable should executive control rest with the Supreme Commander. In such cases it should generally be possible to move the staff dealing with these functions and services more or less in their entirety from the headquarters of the Service Cs.-in-C. to that of the Supreme Commander. Where this cannot be done, duplication is almost bound to result, and the functions of the Supreme Commander are better confined to the laying down

of policy and to co-ordination. Co-ordination is best carried out by inter-Service conferences and committees.

LOCATION OF HEADQUARTERS

The system of Supreme Command emerging from the above principles envisages constant conferences between the Supreme Commander and his Cs.-in-C., a single joint planning staff drawn mainly from the planning staffs of the Cs.-in-C., a minimum of functions and services under the direct executive control of the Supreme Commander, and co-ordination over the remaining functions and services common to the three fighting Services carried out by inter-Service conferences and committees. It must follow from this that the best results, judged purely from the view-point of staff organization, will be achieved by locating the headquarters of the Supreme Commander and all his subordinate Cs.-in-C. together. In practice, unfortunately, this is often impossible, particularly when the Supreme Commander has under him more than one army group, or more than one naval or air force C.-in-C. The direction of the battle will often necessitate the subordinate Cs.-in-C. having their headquarters nearer to the forces they are commanding than would be convenient for the Supreme Commander. In practice, therefore, it will often be impossible for the latter to collect all his Cs.-in-C. round him in one central location. Where it is not possible to do so, it is essential that sufficient aircraft be made available to carry not only the commanders but also their staff officers from headquarters to headquarters at will. Light inter-communication aircraft must in fact be provided on roughly the same scale as have been staff cars in the past. Without them, co-operation and co-ordination of effort will suffer. All headquarters must therefore be located close to an airfield suitable for use by inter-communication aircraft in all weathers.

There is one further point regarding the location of headquarters, or rather of the commanders, which needs mention. It has in the Royal Navy up to the present been customary for the naval C.-in-C. to lead his fleet into action, and this has frequently meant long absences at sea, cut off from all communication with land by wireless silence. Such interruption of intercourse between the Supreme Commander and his naval C.-in-C. may well have serious results, as, for example, over the employment of shore-based aircraft. It would seem that this disadvantage can only be overcome in one of two ways, either by divorcing the appointment of naval C.-in-C. in a theatre of operations from actual command at sea, or for the naval C.-in-C. to leave behind him a deputy entitled to speak for him and with his authority in every respect during his absence.

SERVICE REPRESENTATION AT SUPREME HEADQUARTERS

If the Supreme Commander is to be what his title indicates—a commander supreme over the three Services, and if he is to obtain and retain the confidence of the three Services under him, the representation between the Services on the staff of his headquarters should be equal, in rank as well as numbers. This is of particular importance in the senior appointments.

It is also worth mentioning that the nomenclature of the appointments on the Supreme Commander's staff should not follow that in use in any single Service but should be common to all three (where such a thing exists) or else should be specially coined. Phraseology in the wording of orders and directives by the Supreme Commander also needs to be carefully watched to ensure that the words used convey the same meaning to all three Services.

SUMMARY OF PRINCIPLES

- (a) Ultimate responsibility for the armed forces and for their employment within the theatre of operations must rest with the Supreme Commander.
- (b) Advice to the Supreme Commander must come from those who are executively responsible for carrying out his orders. In respect of the three Services, these are the Commanders-in-Chief.
- (c) Joint planning must be done by officers drawn from the staffs of the Service Cs.-in-C., although on occasion it may be necessary to augment them by officers appointed to the staff of the Supreme Commander.
- (d) The Supreme Commander should as far as possible be kept free of detail. He should only be executively responsible for functions and services which are not the responsibility of any single C.-in-C., or where unquestionable advantage is to be gained thereby. In the case of other functions and services, his duties should be confined to the laying down of policy and to co-ordination. The Service Cs.-in-C. should be given sufficiently wide powers, including financial powers, as to make references to the Supreme Commander unnecessary except on major matters of policy.
- (e) Duplication in executive functions between the Supreme Commander and his Cs.-in-C. should be avoided.
- (f) If other considerations permit, the headquarters of the Supreme Commander and of all his subordinate Cs.-in-C. should be located together. Where this is impracticable, inter-communication aircraft must be provided on a sufficiently lavish scale to make them available at call for all commanders and their staff officers. Headquarters must therefore be located close to an all-weather airfield.
- (g) On the Supreme Commander's staff there should be equal representation in rank and numbers of the three Services.

PART II. ORGANIZATION OF A SUPREME HEADQUARTERS

If the principles in Part I are correct, a Supreme Commander needs a staff to assist him in preparing plans, in laying down policy, in inter-Service co-ordination and in carrying out executive control of those services and functions which are better placed directly under him than under any of the Service Cs.-in-C.

To take the last of these functions first, the Supreme Commander needs a staff in order to exercise executive control of the functions and services directly under him, and such a staff must be large enough to deal with a similar amount of detail as it would if performing similar functions at a Service headquarters. As the functions and services will generally be of a kind affecting all Services, the staff should be drawn from all three Services. Apart from this staff, the Supreme Commander does not need a staff of his own to deal with any detailed work whatsoever.

The joint planning staff is mainly drawn from the staffs of the Service Cs.-in-C. Neither the laying down of policy nor inter-Service co-ordination needs a large staff for working out detail, which should be provided by the Services' headquarters. If co-ordination is carried out by conferences and committees, what is needed on the staff of the Supreme Commander is a secretariat to deal with all the work connected with the conferences and committees and to issue the Supreme Commander's

directives (much on the lines of the War Cabinet Secretariat in Whitehall) and a few, very few, senior officers to preside over the conferences and committees and to carry out that most important part of co-ordination not so far mentioned, paying visits. These senior officers can be adequately served by the secretariat, and should draw what detailed information they need from the Service headquarters. If a fully fledged staff is once introduced, however small it may be in the first instance, it will inevitably grow. A staff makes work, even if unconsciously, and as the staff grows, so will the duplication of work. The only exception, and that not a real one, may possibly be on the administrative side, where some technical officers may be desirable for liaison with their opposite numbers at Service headquarters.

At the head of the secretariat there should be a senior officer to act not so much as Chief of Staff, because the Supreme Commander draws his advice, except on matters for which he is executively responsible, from the Service Cs.-in-C., but as Chief of Secretariat, responsible for the working of the secretariat, for keeping the Supreme Commander fully informed of all matters of which he should be aware, and for drawing his attention to matters which appear to need his intervention.

The inter-Service staff for executive control of the functions and services directly under the Supreme Commander also needs a head who would be responsible for tendering advice to the Supreme Commander on those subjects. In order to avoid a multiplicity of senior staff officers, and from the point of view of simplicity of organization, there seems a great deal to be said in favour of the Chief of Secretariat performing this duty. He would thus become the Chief of Secretariat and of inter-Service Staff. He would need a deputy Chief of inter-Service Staff and a deputy Chief of Secretariat for the immediate control of these elements.

Most of the co-ordination will be on the administrative side, and modern administration is so complex that a special principal administrative officer, with one or two deputies, seems to be desirable to be responsible to the Supreme Commander for administrative co-ordination. He and his deputies should be served by the secretariat, and possibly by representatives of some or all of the technical services, as mentioned above. Whether he should work through the Chief of Secretariat and of inter-Service Staff or direct to the Supreme Commander is a question best left to the choice of the latter.

SUMMARY OF THE ORGANIZATION

- (a) Supreme Headquarters should consist of four elements :—
 - (i) Joint committees and joint staffs drawn mainly from the headquarters of the Service Cs.-in-C.
 - (ii) A secretariat, on the lines of the military side of the War Cabinet Secretariat in Whitehall.
 - (iii) A small inter-Service staff to deal only with those matters which are under the direct executive control of the Supreme Commander.
 - (iv) A Principal Administrative Officer with one or more deputies and possibly some administrative technical liaison officers. These officers should be served by the Secretariat.
- (b) The senior staff officer should be the Chief of Secretariat and Inter-Service

Staff, with under him a deputy on the secretariat side and a deputy on the inter-Service staff side. His duties should be :—

- (i) To be responsible for the work of both the secretariat and the inter-Service staff, in each case working through a deputy.
- (ii) To keep the Supreme Commander fully informed of all matters of which he should be aware, and draw his attention to matters which appear to need his intervention.
- (iii) To advise the Supreme Commander on the matters which are directly controlled by him through his inter-Service staff.

(c) It should be for the Supreme Commander to decide whether the Principal Administrative Officer should work to him direct or through the Chief of Secretariat and inter-Service Staff.

THE OFFICER-PRODUCING CLASS

By MAJOR M. J. P. M. CORBALLY

THREE was a time, and that not so very far distant, when a regiment's "social" reputation marched hand in hand with its professional reputation ; when certain regiments, classified as "smart" or "expensive," were viewed by hostesses and mothers as a pool of dancing, bridge, and tennis partners, and even as a pool of potential husbands. Such regiments could be relied upon to "support the Hunt" and were to be found at full officer strength at the covert-side, slaughtering pheasants, and at every point-to-point and steeplechase meeting.

In that way, in a period separated from us only by such time as it has taken to fight the late war, did the life of the Army officer impinge on that of the community. It impinged, as a rule, on only a small and "privileged" section of the community, for it was an era in which, despite all official protestations to the contrary, the officer was expected to possess "private means" in addition to his pay ; an era in which some of the more simple-minded other ranks still believed that officers obtained their Commissions by purchase ; and an era in which there still lingered the tradition that the Army was an "overpaid occupation" rather than an "underpaid profession."

Those ideas and traditions still lingered, though the majority of officers were struggling along on their pay with nothing to spare for blood hunters and Purdy guns. There was still, however, a minority, but a not inconsiderable minority, among whom it was fashionable to disclaim any knowledge of, or interest in, matters military. This minority confined its interests, activities and conversation to the more expensive forms of blood sport in the pursuit of which its military duties appeared to be no hindrance or even distraction. The average uninstructed citizen, regrettably, was under the impression that this minority typified the Regular Army officer corps as a whole. This impression was as false as it was unfavourable, but it did untold harm to the relationship of the British officer to the community which supported him.

The majority, however, represented the rearguard of the traditional officer-producing class, hard hit by the changed economic and social conditions in the country, and even harder hit by the virtually *unchanged* economic and social conditions in the Army. They came usually from public schools. Their education entailed considerable sacrifices on the part of their impoverished and taxation-burdened parents. They were bred and educated to service and to responsibility ; but their numbers were few in proportion to the community as a whole and inadequate even to complete the officer establishment of our diminutive peace-time Army. One can modestly submit that during the past six years they have proved their worth, but they have been swamped by the masses of the wartime Army, with the result that, as a class, they have become as extinct as the dodo or as the wealthy hostesses who were wont, once upon a time, to entertain them in the stately homes of England.

But the need for them is still there. As far as can be humanly foreseen, this country and the Empire will require for the all-important and by present indications none too simple task of peace preservation, a Regular Army large by pre-war standards and with a highly efficient corps of officers up to full establishment. That officer corps must come from somewhere ; but from where ? The old officer-producing class is no more ; so what is the answer ? The answer is that the need of officers for the reborn Regular Army must be met by the creation and evolution of a *new* officer-producing class. It may be suggested that this has already been done, for otherwise how could our victorious armies have been officered ? To that I reply that the provision of officers as junior leaders for a citizen Army, created to meet an

emergency, is a problem entirely different from that of the provision of a corps of officers (of officer class) for a long-term Regular Army.

Consider the officer—I refer in particular to the young officer—whom the war years produced. Frequently he was good, sometimes he was excellent; he had risen from the ranks through his personal ability and efforts, he usually knew his job, and he proved himself, in the majority of instances, to be gallant and courageous in battle. But there is no blinking the fact that, as the War dragged on, apparently interminably, there was a marked deterioration in the standard of junior officers; this was of course inevitable with increased dilution and the supply of *good* officers consequently falling short of the demand. It is regrettable, however, that there was evolved a type of young officer not over careful in his turn-out and uncouth as to his manner, drawn from all walks of life and all types of schools. In many cases he had been neither bred nor educated to service and responsibility; his translation, via an O.C.T.U., from the ranks was too rapid to enable him to be trained other than technically as an officer, and the accompanying social and psychological training was irreducibly restricted. The result was that only too frequently he was not fully conscious of his position as an officer, with the inevitable adverse effect on discipline. Confusing democracy with indiscipline, he was anxious not to emphasize, in fact scarcely to recognize, the difference in station between himself and his men, to whom he would refer semi-apologetically as the "fellows" or the "boys," never as the "men" or the "troops." No one will deny, however, that the nation has every reason to be grateful to him for, despite his shortcomings by Regular Army standards, he filled the gap *faute de mieux*, very often most gallantly and heroically giving his life in so doing.

I suggest, nevertheless, that, in the embryo and incomplete form in which we knew him, the wartime young officer would be acceptable neither as a potential representative of the officer corps of the Regular Army nor as a potential life-long comrade in an officers' mess. But he and his kind, his younger brothers, are the raw material from which we must fashion our new officer class, so what are we going to do about it? That is our problem. I suggest that the solution should be on the following lines:—

1. The restoration of the prestige of the Regular Army officer in his relation to the community.
2. The provision for him of an attractive career in which hard work will be rewarded by adequate remuneration (the recently published White Paper appears to be a satisfactory *initial* step in this direction).
3. The education and elevation of the potential officer to be worthy of the prestige accorded to his position and to be fit to take his place in society.

In short, in the name of democracy, let us afford equality of opportunity to obtain the King's Commission (which we now do) and also, in the name of democracy, let us elevate and encourage with every means in our power such enterprising young men as grasp the opportunity (which we now do not do).

To consider in turn each of the above suggested courses of action for the solution of our problem. First and foremost, we must create the conditions in which the tender plant of the newly born officer class can flourish by restoring the prestige of the officer, which has been grievously damaged in the war period owing to the culpable failure to safeguard it on the part of those responsible. The position of the officer has been attacked by the contemporary fashion, in these days of confused thought and gutter inspired ideologies, of decrying those qualities in a man which raise him above his fellows and of extolling the virtues of a somewhat drab type known as the

"ordinary bloke." Consequently, the young officer, being only human, was frequently uncertain of himself and of his position and was anxious not to assert himself and run the risk of being branded as a sort of enemy of society. The result was that the relationship between officers and men was frequently of a most casual nature and went far beyond the desirable and traditional stage of friendliness and comradeship. As is only to be expected, discipline again suffered. Nor was it helped in its maintenance by the system under which officers and men queued up together to their mutual embarrassment (a system hailed in certain quarters as progressive and democratic); nor again was it helped by such uninspiring spectacles as Generals staggering along burdened with suitcases (I remember meeting one in Pall Mall—both his hands were occupied with his luggage, and he could only grin affably in acknowledgment of my salute), and parcel-laden Brigadiers strap-hanging in public vehicles.

In short, the prestige of the officer has not been safeguarded, the King's Commission has been treated lightly, and discipline has consequently, inevitably and seriously deteriorated. The fundamental reason for this deplorable state of affairs, I suggest, is that, although there have been many officers, there has been no officer class.

Therefore, for a start, public opinion must be enlightened and educated to the fact that the officer corps of the Regular Army is a very definite entity in the life of the community. Great Britain is now, at any rate for the time being, a Socialist State, so why should we not profit, in this instance, by the example of Soviet Russia—that Mecca of most Socialist dreams and ambitions? In no country in the world at present does the army officer enjoy such high prestige or such a respected and privileged position in society as he does in the U.S.S.R. Certain schools and even restaurants, for example, are open to him and his family, and the masses are excluded. The regulations provide that, in a crowded public vehicle, a "comrade soldier will arise and offer his seat to a comrade officer," and that an officer will on no account be seen carrying luggage or parcels in public. Soviet Russia, in fact, has a distinct officer class, composed of men who have served in the ranks and who mainly are the sons of artisans and peasants. The old Russian officer class disappeared with the downfall of the Romanoffs; a brand new one has therefore been created and evolved. I emphasize that they are not merely officers commissioned from the ranks, but an officer class—a distinct entity in the community and enjoying a highly privileged position in society. If Russia can do that, Great Britain most certainly can do so; but, I repeat, the *sine qua non* is an enlightened public opinion.

Secondly, having provided what we may call the "public" conditions necessary for the creation and continued existence of our new officer-producing class, let us now come nearer home and consider the essential "professional" conditions, the conditions within the Service, if it is to exist and to flourish. It is now, and at last, fairly generally agreed that the Army must be made an attractive career if it is to have any future at all. If it is to be attractive it must, of course, be adequately paid, with suitable and generous provision for married officers and their families (lack of these assurances kept many a good potential officer out of the Army, but greater confidence may now be created by the progressive and realistic proposal in the White Paper to make marriage allowance available at an earlier age than hitherto). Though the work should be hard, harder than in the past, there should be a reasonable amount of leisure, but not the excessive leisure of the old days designed to enable the affluent minority to pursue the occupations which appeared to be their sole *raison d'être*.

Lest I appear to be prejudiced, let me hasten to say that I am not suggesting

that the officer's recreations should be in any way interfered with. On the contrary, he should be given every encouragement in his field sports, for they are, after all, healthy and manly occupations. I animadvert, however, against a system which permitted an officer's prowess at such sports favourably to colour his confidential report and frequently to be instrumental in furthering his career. Let us in future, and for the sake of the officer class of the future, maintain a sense of proportion and treat these and all other forms of sport as what they in fact are : spare time recreations and not full time occupations with a little time to spare for a few unexacting military duties. As relaxations, then, let us consider them and now and finally abandon the pretence that they are of any military value whatsoever. Hunting, apparently, was of value in that it gave an officer an "eye for country" (whatever that may mean), therefore a disproportionate amount of leave was granted for it. Assuming that it did, and assuming that an ardent follower of the Pytchley or the Warwickshire had his eye, not on hounds, but on possible defended localities or defiladed lines of approach, the logical conclusion is that the officers who did not, i.e. could not afford to, hunt had no "eye for country" and consequently were tactically incompetent. (It was this delusion about the "military value" of hunting that burdened the taxpayer with the exorbitant cost of the School of Equitation at Weedon long after it became redundant and anachronistic). It was an unreal world, a world of illusion, and one which we hope has died a natural and long overdue death as the result of the last six years ; it would certainly be a most undesirable world into which to introduce the new officer class.

The world—the military world—into which this class is to be introduced must be one which has adapted itself to the economic and social conditions of the day, in which lack of "private means" is no handicap, and in which no officer is "expected" to spend his leisure moments in the style of a character in the works of Surtees ; a world in which all officers are required to work and work hard, and in which no concessions, either of nature of employment or "time off," are made to the sporting and wealthy (if, in fact, they any longer exist) ; and a world in which the criteria for advancement and success will be hard work and ability uninfluenced by prowess at occupations of a secular and unmilitary nature. In other words, let us create a real professional Army, concentrated on the task in hand, in which the new officer class can play its part and come into its own.

Thirdly, the essential public and Service conditions having been created, let us consider the officer for whose benefit they have been so created. The raw material must come from the ranks, and will have widely varying domestic, social and educational backgrounds. There must essentially be equality of opportunity, and those selected as officer candidates must be proficient soldiers of a high educational standard (which can be attained in the Army), and with qualities, character and personality which distinguish them from their fellows. They will, therefore, be mainly of the smart young N.C.O. type.

That is our raw material. What are we going to do with it ? We must remember that our object is now not the mass production of platoon commanders to lead our citizen armies into battle, but the provision of an officer corps for our Regular Army—the creation of an officer class. Cadet training must therefore be detailed, prolonged, exhaustively and imaginatively planned, and subjected to constant review. A cadet college will of course be required (probably more than one) which may, or may not, be on the existing site at Sandhurst ; wherever it is, it should be styled the "Royal Military College" and the "O.C.T.U." should go the way of emergency Commissions and other titles and expressions associated with the war years. No fees should, of

course, be paid and Cadets should draw pay (the White Paper provides for this) ; they should be styled "*Gentlemen Cadets*" as in the old days. The course should be of at least two years duration, and conducted on the lines of a military University. The possibility of altering the title of the R.M.C. to the "Royal Military University" might even be considered.¹

Training and education should be carried out under three main headings :—
 1. Military ; 2. Academic and General ; 3. Social and Psychological. The G.C. would of course be a trained soldier, so the objects of military training would be to maintain the physical fitness and military efficiency acquired while in the ranks, to inculcate the highest possible (i.e. officer) standard of smartness, drill, and discipline, and to introduce the G.C. to elementary "officer" subjects such as minor tactics, man management, administration and law.

Parallel with military training, an academic and general education would be given with the objects of broadening the G.C.s' minds, to keep them abreast of current thought, and to make them generally better informed and more cultured than were their predecessors. Courses should be available in scientific or classical subjects, modern languages, literature, history, etc., under the tuition of a professorial staff with the highest academic qualifications ; and professors and lecturers should be borrowed as required from Oxford and Cambridge and from the younger Universities.

Social training should be tactfully applied with the object of fitting G.C.s to live in officers' messes and to take their place in any society. Manners, deportment, and dress must therefore be carefully watched by instructors, and any tendency towards unruliness, boorishness and slovenliness must be rigorously checked. The old-fashioned virtues of courtesy and chivalry must be inculcated and encouraged. Again, to seek inspiration from Soviet Russia, Generalissimo Stalin has laid it down that "always Red Army officers must be examples of good bearing and carriage, of tidiness in all respects. Always, too, must they guard strictly the honour and merit of the title—Red Army Officer." That ruling of the Soviet Premier might well form part of the terms of reference for the training of potential officers for our own Army.

Psychological training should be equally tactfully applied and should consist, in general, of training the potential officer in the proper attitude and in the correct relationship between officers and men ; the "fellows" or "boys" mentality must be firmly and finally eradicated. The Cadet must be suitably influenced and educated in the idea that, by taking the King's Commission, he has removed himself completely and irrevocably from the life, ideals and interests of his erstwhile comrades in the ranks ; that never again can he be "one of them" and that, from now on, his attitude and outlook, code of manners and behaviour, and standards generally, must be entirely different. In other words, he must be educated into a different being from his former self—into a member of the officer class, trained to service, to authority, and to the responsibility which is indivisible from authority.

To sum up, then, let us set out to create and to evolve an officer-producing class, entry to which is open to the competent and suitable, irrespective of income or origin, for which we can guarantee an assured position in society, and for which we can guarantee, within the Service, conditions making for happiness and efficiency. Let us, by means of influence, example and education ensure that its components are smart and soldierly, cultured and knowledgeable, courteous and polished and keenly alive to their responsibilities to the Army and to the community. Thus will the future of the officer corps of the Regular Army be assured.

¹ Since this article was written it has been announced that a Royal Military Academy is to be established at Sandhurst.—*Editor.*

EDUCATION AND THE SERVICES

By LIEUTENANT-COMMANDER R. F. COLVILE, D.S.C., R.N.

THERE is always a tendency for the victor in any war to train in the subsequent peace-time in those methods which brought him victory, whilst the defeated endeavour to evolve a method which will overcome those very methods which previously succeeded. The defeated is in the position of the challenger and so has the advantage both of the initiative and the choice of weapons (unlike the laws of chivalry, which split these advantages). It is therefore dangerous for the British to train along lines which are too doctrinaire. It is important that the challenged should be flexibly trained ready to combat any attack whenever, wherever, and however it comes.

There are two trends of social development which will probably continue. Warfare will be increasingly affected by mechanical aids and through energy other than that applied by the brute strength of man; and wars will be won by that side which can design, produce, maintain, and control the best mechanical aids. This, in short, means that victory is more to the wise than to the strong. The role of man in warfare is becoming similar to that of a grid in a triode valve. The grid by controlling the electron flow from cathode to anode obtains amplification of the slight variations of voltage which occur in the grid. Similarly man, by controlling machines, amplifies the power of his own brain.

There is a third trend of social development that is relevant at present. National states go to war collectively and totally. All persons are mobilized and organized in their defence, and even in the field States do not rely entirely on the efforts of those professionals whom they maintain specifically for this purpose. The professional fighting Services are but nuclei who are responsible for the development of warlike weapons, and are charged with the duty of evolving their best method of use and of training in their use. The Services are indeed caretakers, and if caretakers do not know their way about few others are likely to do so.

If, however, the various Services are required to train personnel on a large scale in the arts or sciences of war, they must be able to presuppose a certain level of development and knowledge. The present assumption appears to be that personnel entering the Service are acquainted with the "three Rs"; an assumption which even now is frequently ill-justified. But, as warfare becomes more technical, even operators require an increasingly high standard of scientific knowledge, and maintenance staffs even more so. Whatever the future developments of atomic and other energy, a greater knowledge of the terms in which energy is expressed is highly desirable. To have to teach an increasingly large number of persons concerned with electrics the meaning of amps, volts, watts and elementary laws of physics is wasting precious time. What the officers know to-day, the troops must know to-morrow.

The parlous state of education in this country and the generally low level at which it rests are therefore a matter of great moment to those who are concerned with its defence. True, it is the intention to raise the school leaving age to sixteen; but there are practical difficulties in the way of its realization. The immediate effect will be to increase the size of classes and throw more work upon the too few teachers. Moreover its fulfilment requires a far higher standard of trained teacher than is available at present, better laboratory facilities, and more buildings. The building difficulty is almost as insurmountable as that of trained teachers.

If the general level of the basic training of the nation cannot be raised sufficiently, then the next war (and all fighting Services must work on the hypothesis that it will come) will throw an increasing strain on the Regular.

This war has shown that in total war a large and rapid expansion, both operational and industrial, is a vital necessity. Training of the sudden influx of men and women must be based on the average education of the wartime recruit, and it must be the best available so that an efficient and finished product is turned out in the shortest possible time. The retired officer and rating of even five years back will be out of date (the rate of progress is increasing) and so it will fall more than ever on the Regular both to fill the key positions and to train the civilian material. It follows that the Regular must himself be very highly trained, and the young professional officer and rating should be made as proficient as possible as early as possible in the higher science of their trade, and all ratings must be looked upon as the potential N.C.O.s of the day-after-war-breaks-out and trained to impart their knowledge. The Regular must in fact be above the average citizen's standard of education and intelligence.

To encourage this, "non-substantive rates" and "proficiency pays" must be freely given and be an ample reward to those who achieve them. In addition, far greater facilities should exist for higher education in Service time, and all new entries must be required to reach a much higher standard of knowledge in physics and mathematics than they do at present.

Since much of the general education given to boys under the age of sixteen is probably not essential to the fighting Services, who require a more technical bias, it is for consideration whether a large proportion of Service entries should be recruited at thirteen, or some similar suitable age corresponding to some definite transition in the current educational system, receive a similar type of training to that given to the Cadets at Dartmouth, and from the beginning of his career, and throughout it, trained to be an N.C.O.

Meanwhile the officer must achieve a still higher standard. He requires to be conversant with educational and training methods and of their organization, and he requires increasingly to have a University knowledge of general physics and chemistry. If he leaves school at 17½ his education must be inadequate. After the young officer has some practical experience of the difficulties with which he has to contend and has formulated some of the questions he needs to ask, he should be given a two year University course.

In time the old system of "at sea" and regimental training produced officers with real practical knowledge of organization, training and teaching. But this system is the hard way and too long a process. Education is to some extent a short cut to experience, though of course it can never entirely replace it. But we can be taught what others have discovered and go forward in experience from there.

It is ultimately the human element that controls the machine, and the human element is a product of training and education. Quality of mind must govern the quantity of machines, and you cannot get quality on the cheap.

THE DEVELOPMENT OF TACTICAL AIR FORCES

By AIR MARSHAL SIR ARTHUR CONINGHAM K.C.B., K.B.E., D.S.O., M.C., D.F.C.,
A.F.C.

On Wednesday, 20th February, 1946, at 3 p.m.

MARSHAL OF THE ROYAL AIR FORCE LORD TEDDER, G.C.B.,
in the Chair.

THE CHAIRMAN : I do not think the Lecturer needs much introduction. He joined us in the Middle East—when I say us I mean, of course, the three Services—in July, 1941, and did a tremendous amount to lay the foundations of that working together between the Services which was one of the decisive factors in winning the War. He had four years of this business so he speaks with some authority, and I will now ask him to get on with the job.

LECTURE

DURING the last few months we have heard in this hall a series of lectures covering, at all Service levels, the work of the three Services in North-West Europe in 1944-45. It was originally suggested that, this afternoon, I should deal with the contribution of the Second Tactical Air Force to victory during the same period ; but on reconsideration the Council kindly agreed to broaden the subject so that a longer review might be made.

When some years before 1914, aeroplanes in England first demonstrated sufficient performance in speed, range and height to be of military value, the two Services directed attention to their use. Successful flights underlined the vulnerability of surface forces to attack from the ever open flank—the air. So long as attack from that quarter was limited to missiles thrown from other surface forces there was no undue worry. But here was a weapon quite new in history with a potential effect upon naval and military warfare which could only be fully appreciated as development proceeded.

THE 1914-18 WAR

The Army started well and were so successful in a short space of time that by the commencement of the war of 1914-18 they had, albeit in limited quantity, the means of "looking over the hill." It was perhaps natural that first thoughts should turn to reconnaissance and particularly so in the circumstances of early German success. Information of enemy forces was the pre-requisite of successful holding operations and in the faster-moving warfare the aeroplane was a necessary adjunct of cavalry in overcoming time and distance problems. As lines stabilized, attention became concentrated on the front line and it was at this period that the use of aircraft was widened to include, in some degree, all the tasks now associated with them.

Development and the formation of principles took place extraordinarily quickly in that war. By 1917, fighters were shooting up artillery, flak, troops, etc., in front of our advance; air to air fighting was intense with local air superiority as the prize ; we had reconnaissance, photography, artillery observation, low and high bombing by day with effective night bombing deep into enemy held territory at night. By 1918, fighter squadrons in close tank co-operation were leading the advance from Amiens, strategical bombing against the Rhineland was paying dividends, and in the final flurry in November fighter-bombers in low cloud and rain were making the German retreat position as expensive and chaotic as occurred in Schleswig in 1945. And to

prove there were enough and to spare of Service resources in command, methods, and equipment, the air forces in the Middle East were, at Nablus, to sound the knell of another enemy country. I stress this period of 1914-18 because the principles there thrashed out have remained constant, only their degree and their application changing in accordance with the technical advance of aircraft, weapons, modern aids and the method of control. The command of the air forces during that war and the concentration of effort in support of our land forces compares more than favourably with modern practice. Contact between the soldier and the airman doing the job was very close and there was a mutual appreciation which cemented the forces into a team.

When the 1914-18 war was over the newly born Royal Air Force had to build itself some foundations before it could take to the air in a serious way. National policy during those difficult long twenty years, by limiting the size of the Services, emphasized the need for quality. In no phase of its commitments did the Air Ministry insist on higher quality than in the formations allotted to Army Co-operation; but there was no radical change of methods from 1918.

THE 1939-45 WAR

The Air Force commenced the War in 1939 with a justified feeling of confidence. There was some concern at lack of material resources but the structure of the force was sound. There had been a speed up in preparatory measures for some time before hostilities commenced, and the alarms of the 1938 crisis had enabled the Service to test technical resources and the machinery of operations under peace conditions. Almost at once, in September, 1939, the reports from Poland showed a greatly increased mechanized tempo in German land operations, with a close and apparently devastating air support technique. However, we proceeded overseas as planned with the land and air forces, now called the Air Component, integrated and working well together. The period of the "phoney" war intervened and no real test of efficiency was possible. When the trial did come, it was obvious that nothing could compensate for great weakness in material strength. The story from May, 1940, to the fall of France and in like measure to the fall of Greece is the story of a ruthlessly efficient fighting machine of overwhelming power, which for the purposes of land warfare had built special aircraft, and conducted special training of crews, so that the integration of the forces should be complete.

The German commenced the assault on France in classical style by an attack on airfields to give him air superiority followed by the assault of communications to stop movements. His aircraft then joined in the land battle. It was this third role that attracted undue attention. The Stuka became the pin-up weapon of modern warfare and its method of dive-bombing the platform of perpetual argument. As a country we were more than fortunate to possess during those hard years of 1940-42 a true Air Force with experienced staffs and commanders who would not be pressed into the flattery of imitation. Our Air Marshals were criticized at times but they knew the Stuka was a most inefficient aircraft of value only as a specialized weapon under selected conditions. Dunkirk, which was the highly successful curtain-raiser to the Battle of Britain, showed by the heavy casualties caused to the German squadrons using them what fatal weaknesses Stukas possessed when opposed by modern fighters. Operations in the Channel in August, 1940, confirmed these weaknesses and the enemy himself even appeared to accept the verdict. However, he continued to use them in one way or another almost to the end of the War, but never again after Greece and Crete did he place any reliance on the Stuka for close air support or for successful

land action in the face of our fighters. To me the most interesting point about the use of this specialized dive-bomber was the German care to have an antidote ready in case we used similar methods. It is a precaution that should always be remembered when a new weapon or new method is adopted in war. The answer to low dive-bombing was *flak* and ground fire, as our Blenheims and others found to their sad and serious cost when they tried to hold up the German advance in 1940.

Parallel with the close integration of their specialized land and air forces, which were the medium of the *Blitzkreig*, the Germans developed colour for purposes of identification. They made particular advances in the provision and use of coloured smoke by which they controlled accurate pin-point bombing and ground attack in support of ground forces, and ensured reliable identification of their own ground forces. Wireless communication, ground to air and vice versa was reasonably efficient but there is no doubt that in battle conditions visual aids are more valuable than aural.

NORTH AFRICA

By early 1941 successful operations had been practically completed in East Africa whilst in the Western Desert the pendulum of Italian defeat was being swung back somewhat by the success of the newly arrived Rommel and his Africa Corps. Our land and air forces were working well together and in the air there was great satisfaction at the arrival of the more modern type of fighters. Air to air fighting was not causing any worry and a proportion of the Hurricanes were detailed for specific army tasks of reconnaissance and photography. At home in England the machinery of air support was being studied and developed at Headquarters, Army Co-operation Command. Problems in connection with the combined operations room, the use of tentacles, calls for air support, allocation of targets and so on were being solved, though quite naturally this could only be done on an academic basis.

I was posted from Bomber Command to Egypt in July, 1941, and after receiving directions from Air Marshal Tedder—my C.-in-C. in Cairo—I took over in the Western Desert. My headquarters was a small hole in the ground five miles away from the Army Commander who had somewhat better quarters. There was no combined headquarters, but a good site had been half prepared at a place called Maaten Bagush. The last word from my C.-in-C. had been "Get together"—and the Army were equally keen. So work recommenced at the new site and by late summer, when the 8th Army was formed, General Cunningham and I set up joint headquarters. I think you will agree that this decision to form a combined Army/Air machine was of fundamental importance and had a direct bearing on the combined fighting of the two Services until the end of the War.

Planning for "Crusader" was in full swing. The Germans and Russians were starting to paint gruesome history on a broad canvas, whilst a little way from us Rommel and his armour were lying up outside Tobruk. We built up our land and air strength and practised air support. New mobile equipment was to hand and for the first time there was in air circles, though not yet with the Army, a feeling that air superiority was going to be won and maintained. In the event we never again lost air superiority over our land forces by day though there were local areas, notably Tunisia, where the enemy had temporary success. "Crusader" was a milestone for the Army because of the element of the unknown: an aura still surrounded the German Army—Rommel, German armour, tactics and the fighting efficiency of the German soldier. In these circumstances it was more than ever necessary to ensure maximum air support.

The hard fighting that ensued for the next two or three months proved that the Army/Air organization was sound. Experiments were made with front line control of bombers and the bomb line, artificial land marks were started and night operations were increased. It was a happy Christmas spent at Benghazi but the tide then turned and back came the forces to the Gazala position covering Tobruk. By March, 1942, our air forces were greatly weakened, as projected reinforcements had been diverted to the Far East—at one time at the end of March my fighter strength was reduced to fourteen serviceable aircraft. But we discovered that the enemy air force lacked the initiative of his army and that a judicious mixture of bluff and attack on his airfields kept him on the defensive. From April our air forces gradually strengthened and the full support organization was working well when there commenced the series of attacks which resulted in the loss of Tobruk and the retreat of the 8th Army to el Alamein. The Knightsbridge and Bir Hakim battles were touch and go and with more aircraft it might have been possible to turn the scale. As it was I had to call off highly successful ground attack by fighters owing to aircraft casualties and the lack of reserves. During that gruelling retreat along one vulnerable road in mid-summer the Army were given complete protection from the air. The enemy on the other hand was slowed up and consistently weakened both by direct attack and by the destruction of supplies and facilities at sea or far behind his front. We learnt that a well-organized retreat enables an air force to fall back upon great strength, with the result in this case of being able to call upon more than enough squadrons to seal any breakthrough that might have occurred at Alamein. The advance to Benghazi and the rapid retreat to Egypt were accomplished smoothly by dividing headquarters and the formations into A and B parties and moving on the leap-frog principle. I have not time to go into the many small points that arose during these strenuous days but it was obvious that the maintenance of the Army/Air Headquarters as one formation was the vital factor that prevented worse troubles.

Then for three months or more came the build-up for the battle which was to start the run to victory. Mobile equipment and facilities were redesigned and rearranged on the basis of experience in battle; radar was coming into the fighting area; air support technique was becoming more intimate and effective. But, most important to the Air Force, was the arrival of the first U.S. Army Air Corps Fighter Groups bringing with them a promise of great strength to come and a fund of flying skill, keenness and good will. Their wish to use the same methods as the R.A.F. enabled them to take their place quickly and naturally as a most valuable addition to the Force. The strategic forces controlled from Cairo were building up strength and working on enemy supplies so successfully that Rommel's attack, early in September, was to be his last for a long time. That attack, which lasted only two days, was an excellent example of the Army holding the ring whilst the Air pounded the inside by day and by night.

With overwhelming land and air resources and complete air superiority, the result of Alamein at the end of October could not long remain in doubt. Once the break occurred, on 4th November, the urgent need was to speed up the German retreat so as to put fighters on to Martuba airfield by the 15th of the month—the day on which the badly needed Malta convoy was to pass through the Crete-Cyrenaica channel. This timetable was kept and the advance continued so successfully that Christmas carols were sung at Agheila, our furthest West to date, and Tripoli was taken early in the New Year of 1943. The whole advance was essentially a race for airfields which the enemy tried, in the main unsuccessfully, to deny to us by mining, ploughing and other forms of destruction. The mutual support of the Army and the

Air Forces set new standards and was marked by particularly keen and gallant work by army formations in clearing airfields. Considerable forces were at times kept out of the line so as to help prepare airfields and in every way the air co-operation by the Army was a model of its kind.

BASIC PRINCIPLES

General Montgomery had shown full understanding of air problems and the air work with his Army since the day of his arrival in the Western Desert. Before I left him in January, 1943, to form an Air Force on Army Group level in Tunisia we discussed some doctrine and checked up how far we had travelled along the road of Army/Air efficiency. As there was a pause in operations the Army Commander also held an important staff exercise in Tripoli. The turn of the year brought confirmation and enunciation of certain basic principles :—

- (i) Air superiority is the first requirement for any major land operation.
- (ii) The strength of air power lies in its flexibility and capacity for rapid concentration.
- (iii) It follows that control must be centralized in an Air Commander and command exercised through Air Force channels.
- (iv) Air forces must be concentrated in use and not dispersed in penny packets.
- (v) The Commanders and their two staffs must work together.
- (vi) The Plan of Operations should be mutually adjusted and combined from the start.

TUNISIA, SICILY AND ITALY

Reorganization took place in Algeria and Tunisia in February, 1943, and the 1st Tactical Air Force, comprising American and British air forces, was formed on an Army Group level. The enemy were taking advantage of some mistakes that were being made but by the end of March everything was tidy, and with the 1st Army and American forces pressing in from the West, the 8th Army coming up from the South, and powerful air forces maintaining air mastery over Tunisia, the stage was set for a great victory. By the end of April, the enemy air forces had been eliminated in North Africa, his supplies and reinforcements had been stopped, his air bases in Sicily were severely pounded and our land forces were closing in for the kill. On 7th May, the drive for Tunis commenced with all air forces clearing the way on a narrow front. This was the first occasion where heavy bombers were brought into tactical operations, and the resulting bomb carpet—to which a certain distinguished proprietary name has been given—did the trick. The front collapsed and with communications destroyed, control gone and one hundred miles of inhospitable sea behind them, 200,000 fit, keen, healthy Germans and a proportion of Italians gave in. The end was very sudden and is best illustrated by the experience of an American General on the Northern flank. On the 7th May he was fighting hard and calling for air support, which could not be spared from the main drive, and on the 9th he was wondering how to control and feed 40,000 German prisoners.

With North Africa clear, and priority of supply being given to the Mediterranean theatre, plans were made for amphibious assaults to the North. Pantellaria was captured after an air assault that somewhat resembled a test tube experiment. The airfields of Malta were being cleared and stocked whilst our strategical forces were reducing the enemy airfields of Sicily and some in Southern Italy to complete unserviceability. In perfect weather preparations went ahead quickly, and early in July the assault was launched with complete air superiority. The Army/Air machine

worked from Malta, and within three days operations commenced from captured and prepared strips ashore. Supply over the beach-heads flowed smoothly and after the initial build-up fighting proceeded so successfully that within forty days the campaign was over. Two or three new experiences were recorded this time. The assault was preceded by interdiction of roads and rail, with particular emphasis upon certain villages. For the first time the Army requested the blocking of villages on a large scale and it was therefore during this brief campaign that the German, fighting without air support or protection, first learned that a village was a target and should be avoided. We found also that our own forces could be seriously delayed and impeded by the results of our own bombing, and finally, the escape of a large number of the enemy at Messina proved that a density of flak can be provided so lethal that air attack can be held off sufficiently to maintain communications.

For the attack upon Salerno, timed for 9th September, a complete break away from the past was accepted. Up to the time of Sicily a distance of fifty to eighty miles from our lines was accepted as an extreme cover distance for fighters. With the use of long-range tanks this distance was considered reasonably economical. The distance was now greatly increased and the hazard of ensuring a well-covered landing by a large force 180 miles from base was accepted on the basis of greatly increased air strength which included new long-range American types and the use of Fleet Air Arm fighters. After the crisis of the fourth day, when another heavy fragmentation bomb carpet stopped the one dangerous German counter-attack, all went well and steady progress was made until winter weather intervened. The summer weather had provided uninterrupted day and night flying conditions for approximately five months and I found it necessary to give warning that European conditions of climate would raise considerable difficulties and would reduce the amount of air support which could be given. The German armies had learned to fight without air support and our ground forces should be ready to do the same when flying was impracticable.

I have spent considerable time to talk about the Mediterranean Campaign because it was here that the machine which was to sweep North-West Europe was forged and tested. The processes of Allied Command, staff structure, dove-tailing of the three Services of each nation into a team, evaluating equipment, armament, methods—all of these came from the Mediterranean after trial against the enemy who was waiting in strength in the North. In the Mediterranean itself all these lessons were used early in 1944 in the Anzio operation in Italy where for some time full air strength was necessary to hold the enemy in check and nourish our forces ashore.

NORMANDY

The most elaborate field equipment was ready in England in early 1944 in preparation for "Overlord." Ample air forces, with the emphasis on fighters, fighter-bombers and medium bombers, were deployed with the Tactical forces organized in mobile formations. The tremendous administrative organization was being geared up and linked with the Army machine. Some operational changes were necessary and these were well under way at the start of the year. As a result of years of intensive air to air fighting without any accompanying land operations, air crews, and particularly fighter pilots, had to have their minds re-orientated onto ground attack and be made to think first, foremost and almost all the time of land operations. Excellent conversion courses were doing this and were teaching crews the use of rockets and other improved weapons. The Rocket Typhoon and fighter-bomber was becoming almost a specialized weapon. All this concentration on ground attack was

possible because there was adequate air strength to ensure complete air superiority for the assault and over the battle area.

Air operations designed as direct preparation for the assault of 6th June were commenced some months beforehand. Reconnaissance of the beaches and areas inland together with the prevention of enemy reconnaissance; complete photography and the location of enemy defences and his radar warning systems; the commencement of the communication interdiction plan by the heavy bombers; together with the stepping up of attacks on the oil industry of Germany; and finally the attack upon radar, airfields, bridges, special communication centres, all had the object of masking the landing place and isolating the lodgment area. In general the plan followed naturally on experience gained abroad. Both American and R.A.F. Tactical Air Forces, which included many squadrons from Allies and Dominions, were placed under one command at Uxbridge. I, as Commander, worked directly with the C.-in-C. 21st Army Group who controlled all the land forces involved. The Air Commander-in-Chief, at Stanmore, came directly under the Supreme Commander and through him had a call upon the Strategical and Coastal Air Forces. A reconnaissance centre where all reconnaissance information was dealt with formed part of the Tactical Headquarters and a few hundred yards away the resources of 11th Group Headquarters were used for the Air Control of all the fighters employed on protection duty. The offensive strikes of the fighter-bombers and the bombers were all pre-arranged. The organization of control at Uxbridge allowed the Tactical Groups—American and British—to be packed up ready to land in the lodgment area as soon as they and their equipment could be got ashore. The first echelon was ashore on "D" day and night fighter protection was given that night. It has since been learnt that barely 80 German fighters were available in France to resist the invasion and that this number was not improved upon until our ground forces were well on the way to Germany. Nevertheless, major effort by the fighters was concentrated on the protection of convoys and the beach-head, and it was not till Tactical Headquarters were working ashore that attack on the enemy's back areas, his movement and his ground forces commenced in earnest. There were difficulties, the most worrying being the congestion in the area. It had been planned that the Caen area would be used for a number of airfields but sufficient advance could not be made and the result was crowded airfields with strips jostling for room in dump areas and in one or two cases near enough to the enemy to be under effective shell fire. It was a trying time, particularly for the administrative authorities, but mutual adjustment between the Services was a friendly, smooth business.

The enemy gradually built up resistance mainly by spasmodic movement at night. The roads were scoured by fighter-bombers and fighters by day and movement both by rail and road was practically non-existent. The contrast to our own side of the lines was most marked. The German, however, was becoming expert at fighting against air superiority and in this he was helped by the close, heavily-treed Bocage country of Normandy. When his attacks threatened there was an Army call for air attack on selected villages. This became somewhat worse after 9th July when the heavy bombers first came in to the tactical battle in force. There is no doubt that the effect on morale of our own forces by the sight and sound of a heavy bomb attack is considerable, but in very few cases can the effort be justified. I shall discuss this matter later. The proposed attacks upon Allied villages caused me great concern as experience for some time past, commencing in Sicily, had taught the German to avoid villages. Remaining outside or moving around them offered no handicap or

hardship in summer weather. The Air Force, therefore, made every effort to cut roads and bridges leading into Allied towns and villages but to spare the towns themselves. Later in the campaign, when a small Allied village had to be attacked, a warning was given by the use of single bombs from fighter-bombers before the main assault so as to warn inhabitants to get out of the way.

The American thrust to the South so enlarged the bridgehead that it was possible in August to bring Headquarters 2nd T.A.F. and Headquarters 9th U.S.A.A.F. to the continent, each Headquarters to command its own Air Forces in association with its respective Army Group Commanders. The Army Commands were soon to be nationally clear under the Supreme Commander whilst the Air Forces still maintained an extra link in Command. This was unfortunate because it gave the Army Group Commanders two airmen to deal with, but the position was to be rectified later. As a result of the American Third Army breaking through towards Le Mans-Laval, the enemy launched a full attack on 7th August using his best Panzer divisions to cut the U.S. communications at Mortain. Working in close liaison, the American Air Forces prevented any German fighters from reaching the area whilst the Rocket Typhoons stopped the armour. This was the first occasion in Normandy where the Air Forces had an opportunity of striking at an enemy armoured concentration and by the evening of a perfect day complete success had been achieved. This enemy thrust proved to be the undoing of his defence system in Normandy, and with the destruction of armour and supporting transport he fell back into the pocket of Falaise which was formed by the advance of the Americans from the West and the British from the North. By 15th August the neck of the pocket was only 10 miles wide, and by the 19th it was closed, but not before many enemy had escaped in spite of tremendous casualties from the Air and Army artillery. It was unfortunate that a national Army Group boundary coincided with the pocket—it raised a difficult air problem which was repeated later in the Campaign. Another worry was the tendency for the air forces working in support of the armies to shoot up friendly forces closing in from the other side of the salient or pocket. Fairly rigid front line control is necessary to prevent this.

The enemy retreat to the Seine continued but in spite of heavy casualties and constant day and night harrying from the air he managed to extricate approximately two-thirds of his force. The weather was kind and facilitated the building of fresh air strips and the repair of German airfields. Interdiction was continued and every attempt was made to cut the main crossing at Rouen on the Seine, but though very serious damage was inflicted, particularly at night, nothing short of physical interdiction could have prevented the enemy escaping. Once again the national Army Group boundary prevented the timely closing of the gap. During this month of August the 2nd Tactical Air Force destroyed 10,500 German transport and armoured vehicles and gave the Army complete freedom from enemy air attack.

THE LOW COUNTRIES

The run up from the Seine to Belgium by the British Forces put a certain strain upon the Tactical Air Forces, but the operational position was eased by the increasing range of aircraft and the experience and skill of all concerned in preparing airfield strips. On such occasions all formations, in the exhilaration of the pursuit, produce surprising resources by means of self help and compromise. Air Transport gave great help though in due course the armies wanted more as their needs were so much greater and had to be delivered on the spot. The forward Tactical Group, moving in bounds of 100 miles, did not slacken till they reached winter location in the Low Countries

near Eindhoven after the enemy resistance hardened on the Meuse. Meanwhile the ports along the French and Belgian coast had to be dealt with, the occupation of the Breskens Peninsular being the most Northern Sector. The Army formations dealing with the coastal areas made considerable demands upon heavy bomber units.

In the spirit of optimism of September the Airborne operations were launched perhaps too far ahead at Arnhem. The operation was the first part of a plan to break out into the North German plain and in conjunction with the American Army on the right to surround and capture the Ruhr. Walcheren—the island at the mouth of the Scheldt—was to be captured as a prelude to the use of the Port of Antwerp. The operation failed to give our forces a bridgehead over the Rhine but it taught lessons which were successfully put into effect for the crossing of the Rhine. The main recommendation adopted subsequent to the operation was that the Tactical Air Force, through whose area and on whose front the Airborne operations are conducted, must be the co-ordinating air authority.

Having started so well in Tunisia the Air Observation Post squadrons continued to do most excellent work in North-West Europe. Not only did they economise air effort that was more urgently required elsewhere, but they acquired an enviable reputation directing retaliatory fire against enemy artillery. They became the ideal instrument for directing accurate fire on enemy-held fortresses. It must be remembered, however, that the A.O.P. is a valuable by-product of air superiority without which it could not function efficiently.

During October the air command was again adjusted, the principle changes being that the Deputy Supreme Commander assumed direction of all air operations under the Supreme Commander, and with the elimination of Headquarters A.E.A.F., I, as the A.O.C.-in-C. 2nd Tactical Air Force, became the one airman dealing with C.-in-C. 21st Army Group. The Headquarters of 21st Army Group and 2nd Tactical Air Force were alongside each other in Brussels where communications were excellent.

Steady progress was being made in opening Antwerp and preparing for an attack in Holland when on 16th December the enemy sprung a tactical surprise. The Ardennes offensive started in non-flying weather and the period included the shortest day of the year. Necessary adjustments were made and after five fine days commencing on 23rd December the enemy was stopped and badly punished. The snow-covered defiles and choke points were ideal targets for air attack and both the Tactical and Strategical Air Forces were most successful. There was to be one more surprise before normal preparations for the advance Eastward were resumed. On 1st January, 1945, the German air force attacked most of the British and a number of American airfields. The idea came from a reckless young man named Pelz, and Gallands' description of the party was "the last dagger thrust into the back of the Fighter Force." I think it appropriate that a leading German commander was brought down by a Belgian partridge. The German air force never recovered from this day's loss of valuable pilots.

After the enemy wave had broken on the Ardennes and receded, preparations and fighting went ahead with the object of lining up on the Rhine. There was intensive fighting and much difficult close support work in the Reichwald Forest area. By the third week in March everything was ready for the crossing of the Rhine. During the winter many problems had been encountered. The Army had serious road difficulty and the Air Forces were strained to provide all-weather airfields, winter accommodation, welfare facilities, and to build up a reserve of pilots and aircraft for the Spring offensive. But the main task of maintaining air supremacy deep into enemy territory

and carrying on the interdiction programme continued. The enemy was beginning to use jet-propelled aircraft but not effectively as he was short of fuel and our aircraft sat over his airfields by day.

GERMANY

In accordance with decisions taken after Arnhem and because the assault by C.-in-C. 21st Army Group was given priority by the Supreme Commander, I, as Tactical Air Commander on the front concerned, was detailed to plan and co-ordinate the whole air operation including strategic and airborne forces. Approximately twenty-five representatives with executive authority from all the Commands concerned attended at Headquarters. By preparing beforehand the specific questions to which answers were required the meeting was over in three hours. I give these details because the resultant air operations, which took place in perfect weather on 24th March, though complicated in the extreme, were flawless in execution and in result. A total of ten thousand sorties were flown, an airborne corps was landed and the Army crossed the Rhine as planned.

By 28th March, when the Battle of the Rhine was declared won, all effort was concentrated on the advance to the Elbe. The C.-in-C. 21st Army Group was told of the difficult airfield situation in Germany and he immediately directed that columns should make a special effort to take airfields and that repair forces should be given priority on the roads. By early April the Ruhr was isolated and the garrison being dealt with, while on the 7th of the month Army Group Tactical Air Force Headquarters moved up to the Rhineland. The enemy air force was causing no trouble—he appeared to be splitting his forces between Schleswig and the South of Germany, and shortage of fuel was causing him to abandon and destroy equipment on crowded airfields which could not be evacuated. By mid-April the intention was to cross the Elbe and seize Lubeck and Kiel, advancing to the North to clear the country to Denmark. Our forces were nearing the Russians and strict instructions had to be issued to prevent incidents in the air. In front of the Russian ground advance towards Lubeck there moved a disorganized mass of enemy transport making for Denmark. This was so seriously dealt with as to hasten the surrender, but not before mass attempts were made to escape by sea. On 3rd May a strike by aircraft of all available commands was made against ships of all sizes trying to escape up the Danish coast from Lubeck, Kiel Bay and Cuxhaven, and a total of 160 ships of all sizes were sunk or damaged.

Cease Fire was ordered as from 8 a.m. on 5th May, 1944.

MISCELLANEOUS MATTERS

ADMINISTRATION

It is axiomatic that flying operations and combat efficiency in the air are dependent upon administrative efficiency and organization on the ground. The Western Desert was called a quartermaster's headache, but as such it proved to be a fine training ground. The result was seen in North-West Europe where the Royal Air Force Command numbered over 100,000 personnel on the ground, serving many units with diverse needs, but where operations were never once held up through administrative failure. The contrast between an aeroplane on the ground and that same vehicle in the air always fascinates me. On the ground it is a useless, expensive, defenceless contraption; in the air a thing of beauty and of surprising power. The metamorphosis is made possible by administration. As an illustration of the com-

plexity of the administrator's task in an amphibious operation, he has over forty-five important ancillary formations to look after in addition to the main combat requirements. They must all be included in the Plan. In addition diplomacy is sometimes called for in dealing with other Services, particularly during crises when resources are strained and the 'small brother' status of the air force on the ground is emphasised; but during all my experience the administrative relationship between the Services has been excellent.

THE HUMAN FACTOR

I am on somewhat delicate ground here but I think it is most desirable to recognise the importance of personality in war: I refer to commanders and senior officers generally. The air forces are vitally affected by the way we tackle this problem as we are generally outranked and vastly outnumbered on the ground in an operational theatre—in my own case the force was outnumbered ten to one. The tendency is for the younger and smaller relation not to be given full equality of status. This is quite natural, but it must be resisted, otherwise great disservice will be done to the Army or Navy as the case may be. The need is that the Air Force Commander shall possess three essential qualifications: (a) he must know his stuff; (b) have the courage of his opinions; and (c) possess maximum good-will. By giving way in council it is easy to create a nice friendly atmosphere, but the enemy cares little for politeness—efficiency based on knowledge and character is what counts.

Field Marshal Montgomery has explained why he kept himself away personally from the Army/Air machine and we all respect his reasons. I was sorry because association with the 8th Army Commanders in North Africa and the vital year with General Alexander had been so happy and fruitful. This separation was a potential weakness which did not become apparent because of our continuous winning sequence in the War and the security bestowed by air power. But we shall not always be in such happy circumstances and for the future I would suggest consideration of well-tried methods. All that is desirable is that the Commanders should be within easy meeting distance of each other—they need not live together.

Before leaving this subject I should like to stress how happy and cordial were the relations of senior officers and staffs during the four years of my experience. This relationship was the basis of the team spirit of the whole force.

INTERRUPTION OF ENEMY COMMUNICATIONS

It may be accepted that an air force cannot ensure complete physical interdiction of a narrow position. By this definition I mean such places as the Straits of Messina, the Seine, the Rhine and so on. In such a case as Tunisia with a hundred miles of sea to cross, adequate air strength in reasonable weather can stop movement. It is essential that ground forces should recognise this limitation and do everything possible to complete interdiction on the ground. I have already referred to the Army Group boundary in this respect.

USE OF HEAVY BOMBERS IN A TACTICAL ROLE

This is a controversial subject which would take much argument to cover. The use of this weapon in the battle area as at Tunis, Salerno and Anzio, where fragmentation bombs decimated enemy concentrations, was classically correct. The bombing by demolition bombs of communications in the Ardennes was most effective in disrupting the enemy. The use of this bombardment power when artillery or ammunition are in short supply may be the only alternative. But the bombing and

cratering of towns and strong points, such as Cassino, Caen and many others did not give the results required. In a number of cases the Army were hindered. The usual intention in North-West Europe was to block enemy movement but with summer conditions the destruction of a town did not have this effect. Practically all the attacks upon villages were specifically called for by the Army—I am afraid I resisted and tried to get the result by other means until Germany was reached. The moral effect on our forces is good and has definite value in the use of heavy bombers though gross errors must be avoided.

POLICY OF WEAKENING ENEMY

The thoughts of an Air Commander, particularly at Tactical Air Force level, go naturally deep into enemy territory as he seeks to exploit the full potential of the air weapon. The Army Commander is concerned principally with his front and the enemy threat to his front. I found that this absorption on front line battle tended to spread to the Group Commander working with the Army. It is a tendency to be watched because unless the enemy is weakened and interrupted a long way behind his front he will face up to the battle with unimpaired strength. Air Commanders would be well advised to act as a continual check in the tendency to use all air strength in the front line particularly when our forces are being attacked.

CONCLUSION

There are many other items one could discuss: the magnificent work of the airfield construction units and our reliance on air formation signals—both essentially Army supply; casualty air evacuation which had such an effect on morale; the medical service, movement, air communication units; the decision to carry post and newspapers by air, welfare; an establishment committee with authority to make and unmake establishments as required by the war situation—all these and many more; but I must stop.

May I give you my analogy—the humble sandwich. Before the air forces came the Navy and the Army were as two pieces of bread and scrape with nothing to hold them together. The air was, by 1918, so substantial that the two pieces of bread with a good spread of butter had a solid lump of bully beef between them and were a sandwich. As time went on it became bread and scrape again with just some paste to hold them together. This went on for a long time, long after this war started, but by 1942 a change was taking place and then, in North-West Europe, the sandwich became two big pieces of new bread covered in butter with a solid piece of spam in between and masses of garnishings everywhere. It was the inherent strength in this super sandwich which beat the German.

It would be easy to delve into future possibilities and the fantastic world of science and new weapons. I prefer to pin my faith on steady, enlightened development of what we know and to exploit the great human qualities which have been shown so admirably during the War.

DISCUSSION

CAPTAIN E. ALTHAM, R.N.: I do not want to ask the Lecturer to embark on another lecture, but I wonder if he could just touch upon the development of the material side as it affected Tactical Air Forces. The most untechnical of us know that there were immense changes and improvements in the actual aircraft themselves as regards speed, range, armament, size and so on; surely that must have played a very big part in their potentialities?

THE LECTURER: At the beginning of this war we were limited in missiles to comparatively small bombs and to .303 machine gun fire. The first big advance in fire power both for air to air combat and in ground attack was the arrival of the cannon.

Naturally, during the whole six years the performance of aircraft continued to improve very quickly, and with our need for successes in the field of ground attack, we developed rockets and the art of the fighter-bomber. Parallel with greater speed and strength of aeroplanes came long-range fuel tanks which increased the range of aircraft and automatically the potential. Whilst this was going on in the fighter world, the types and sizes of bombs in Bomber Command continued the same rapid development. Ultimately we had the super bomb; the big incendiary; and particularly, as regards its effect on land warfare, the fragmentation bomb.

Together with these material advances came scientific aids, such as radar and the gyro gunsight which ensured the most accurate and effective use of weapons and missiles. Incidentally, it was shown that all these developments had to be correctly applied because the use of the wrong weapon for a task did not get results even though used in great strength.

ADMIRAL SIR ERNLE-ERLE-DRAX: I should like to say a word about the future, because although it is of great interest to see how this co-operation between our various armed forces achieved such tremendous success, we must remember that any study of the history of the past is mainly of use as a foundation for studying the problems of the future.

When we reflect on the battles that may occur in the next war, if there is one in our time and if it is fought with atomic bombs as it well may be, I think we must realise that it will present to us tremendous new problems. Battles will be fought which will be, perhaps, fundamentally different from those of the last war, and we must therefore guard, as ever, against the danger of occupying ourselves mentally in preparing to fight the last war over again.

Let me give an example of one or two future difficulties. The R.A.F., I suspect, will be torn as always between their desire to help the Navy win their battles at sea, to help the Army win their battles on land, and to get on with their own job in the skies. This work will probably have to be done at the beginning of a war with very inadequate resources, as we so often have had to do in the past. I suppose the R.A.F. will have to help the Navy bring our convoys to these shores, carrying approximately a million tons per week of supplies without which this country cannot fight or live. They may also have to assist the Navy in hunting down U-boats which, if one or two were placed within two hundred miles of our shores, might loose off rockets with atomic bombs and obliterate London.

So far as the Army is concerned, the R.A.F. might find it necessary to support an Army which has been sent East to ensure that we do not lose the Suez Canal; or they may have to support an Army which has to ensure that the enemy does not gain possession of the Southern shores of the English Channel. They might even have to support an Army which is sent across the Straits to capture areas where rockets have been placed in the Calais cliffs ready to carry atomic bombs which would certainly destroy London. In addition to all that, the R.A.F. will no doubt have to do one of two things in the air—either it must achieve an impenetrable defence over the British Isles and other vital areas, or, even more difficult, it must destroy or put out of action the factories in enemy countries where atomic bombs are constructed, and all those holes in the ground where they may keep the bombers or rockets which are going to carry the bombs to this country. That task alone seems to be one of terrific difficulty, and further, we must expect in the next war that everything will move at a pace perhaps three or ten times as fast as the pace at which battles were fought in the last war.

It is not for me to make proposals as to how these problems will be solved, but I should like to suggest that they will require a good deal of hard thinking, because

they are likely to prove even more complex than the extremely difficult ones we had to tackle in the last war.

GROUP CAPTAIN G. G. BARRETT : This is the third lecture in recent weeks in which we have heard of the success of integrated air forces. It is now for us, the members of the three Services who are going to have to fight any war that comes, to learn the lesson and apply it.

I was one of the people involved in Lord Tedder's experiment to integrate the British and American air forces in North Africa. We have heard of its spontaneous success. Since then I have been privileged to be a member of an air force team working with the Combined Chiefs of Staff in Washington. I think it fair to say that all of us over there became integrated into the American forces. By integration, I do not mean treated as a privileged guest with the red carpet, the Admiral's car and the General's cigars, but kicked around, bawled out and made to stand in line like any American. We all became as much at home in the messes, airfields, establishments and Service departments of the American forces as we are here in our own Services in England. What is more, we met very many Americans who claimed that they were just as much at home among our Services as they were among their own forces in the United States.

As I see it, the lesson of all this is that if this peace is to have teeth, the foremost tooth is going to be an air tooth. What is more it is going to be an allied air tooth. If it is going to be a good tooth, it must have a good root which is the mutual confidence between the air forces which compose it. This confidence is not a thing you get overnight merely by creating an allied force. You have to work for it. It grows slowly. It comes not only from the knowledge of the strength and achievements of your allies, but also from an honest appreciation of their failures and their weaknesses. You get it by living together, working together and squabbling with each other.

It is now for us, therefore, to extend into peace the facilities which we have set up in war for the exchange of men, commanders, units and equipment between allied forces. We must have facilities for allied forces to get together in peace. We must struggle now to prevent anyone from denying us this thing because it may well be the very essence of our future salvation. We must struggle now so that, if ever we have to form an allied force again, that force will go into action not only properly armed but as a united team.

AIR CHIEF MARSHAL SIR GUY GARROD : With regard to the extent to which air attack can prevent the retreat of an army, I feel that much depends upon the length of time that may be available for strangling the enemy's communications.

Before the final attack in North Italy in April, 1945, there had been a period when the Army had not been able to advance ; but during the whole of the previous winter the Air Force had been fully engaged on a policy of interdiction applied to the whole of the enemy's communications up to the Alpine barrier and further North in Austria and Germany. I think it is fair to claim that all enemy rail and road movement, and practically all enemy water movement had been stopped by the date when the Army made its assault, but admittedly there had been a period of several months in which to concentrate on that job. The result was that the enemy's army was completely immobilized when the assault came. He did try and relieve his divisions, but the relieving divisions had to walk : there was no transport of any value. He was not able to call on divisions far away from either side of the gap which had been created in his lines.

When the enemy fell back to the River Po, hardly a single vehicle or gun got across the river. All the bridges were already down, but the enemy had gone to great lengths to collect barges and every kind of river craft, and he had cut the banks and made approaches down to the water's edge. However, continuous day and night bombing of the river craft and the approaches to the river effectively stopped guns and transport from crossing. The German commander stated after the surrender that although large numbers of men succeeded in swimming the river they were no longer an organized fighting force.

It is no exaggeration to say that in April, 1945, in Northern Italy the enemy was

prevented, entirely due to air attack, from withdrawing his army across the River Po. This made his surrender inevitable.

THE LECTURER : The main factors, of course, are time and the weather. You would have had time in Italy to smash up all the enemy's facilities on the river that he had to cross, but under normal conditions the time factor is much smaller. In the case of the crossing at Messina, for instance, the campaign was over in thirty-eight days. I think the only case on which you can say that full interdiction is physically possible from the air is when there is an ideal set of circumstances, but even so, men cannot be stopped by air action. It unfortunately happened that men who escaped from Falaise and across the Seine were valuable and experienced contingents who afterwards were the backbone of the defence further North which stopped us going on at the end of the summer, and thereby kept the war in being throughout the winter.

AIR MARSHAL SIR RODERIC HILL : The Lecturer referred to the effect of air support, particularly when that support is overwhelming. There are two ideal situations which were exemplified in the late War. In the initial stages of the War the Germans had this overwhelming air strength which was so powerfully articulated with the land forces, and towards the end of it the same sort of thing took place the other way round.

In war it seems to me that these are not the most interesting periods. The really interesting times are when the machine you have is put to the test. For instance, that occasion to which the Lecturer referred when he had at his disposal only fourteen serviceable aircraft would appear to have been the time of real test, and he told us how he met the situation, by careful planning and the clever use of bluff. I believe that Admiral Cunningham did the same kind of thing in the Mediterranean.

There are crucial times in a war when no matter what weapons are used or how the methods of war change, a battle has to be fought out in unfavourable circumstances. That is what we have to bear in mind in future. In the event of war, our position at the beginning might always be difficult and we must study the best thing to do in those circumstances.

BRIGADIER-GENERAL W. F. S. SWINY : There is one subject upon which the Lecturer has not touched, namely, the question of flying-bombs and rockets. Who was responsible for dealing with their emplacements and what success was obtained ?

THE LECTURER : The person mainly responsible for tackling the flying bombs was Air Marshal Sir Roderic Hill who has just spoken. In point of fact, the over-running of the bases was kept in mind the whole way through and this subsidiary aim acted as an incentive. The drive up from Normandy was linked with anxiety to over run the Pas de Calais and the flying-bomb launching bases before England could be more seriously hit. The actual defence, however, was operated from England by the Air Defence of Great Britain and the Anti-Aircraft Forces at home. The use of heavy bombers to bomb the sites beforehand turned out to have been highly successful, the enemy assisting by building sites which, though ideal scientifically, were lacking in camouflage. However, they learned from their mistakes and towards the end of the campaign they made the flying-bomb sites and the rocket launching sites so inconspicuous that it was practically impossible to deal with them by any method except capture on the ground. As the War progressed the enemy sites moved further East and England was spared as Antwerp and other places on the ground became the main targets.

THE CHAIRMAN

There are one or two points I should like to take up, the first of which is the "classical" use of the air by the Germans to which the Lecturer has referred. It was all in the book, and it worked as long as they had no serious opposition ; but once the Germans began to have serious opposition it did not work. Yet in theory it was perfectly correct. It was what we ourselves did later on, when it worked. So I think we have got to be rather careful in drawing conclusions from those early days. I really do not think the Germans understood much about it. My feeling is that although they had excellent

integration between their air and land forces, they thought in terms of land the whole time. They were not prepared, as I see it, to fight an air battle. They were neither equipped, nor trained for it.

The Lecturer referred to the very natural tendency of those who are concerned in a land battle only to think or see within the range of their own battle. It is a natural tendency, and even the Lecturer I accused once or twice of being guilty in that respect, namely, of not fully appreciating what was being done by other supporting forces far behind. One has got to watch that.

I do not like that word 'interdiction.' It is a narrow word and is apt to give only part of the story. If by interdiction you mean strangling an enemy's communications, then it is all right. On the other hand, if by interdiction is meant merely the cutting of some rail and road bridges, it is, as I say, only part of the story. When we think of that landing in Normandy and the weeks of build-up, and speculation as to the enemy's possible build-up to meet us, and how he failed completely to build up to the same strength, even nominally, as we did, we get an idea what interdiction means; because that interdiction campaign stretched right back from the roads and bridges in Normandy to railway communications in Belgium, Holland and Germany itself.

I think one needs to keep in mind a broad picture the whole time with regard to the air, and I do hope that we shall remain the thick succulent sandwich to which the Lecturer referred. We three Services grew together very well during this last war; but not enough. As the Lecturer mentioned, we have got very difficult problems to face now, but we must face them as three Services together and not three Services separately, otherwise each of us will be preparing to win the last war or the one before the last on land, sea, and in the air separately, and that is no good. Therefore, I do hope we shall apply the principles which the Lecturer has mentioned to our new problems.

In conclusion, I should like to propose a vote of thanks to the Lecturer for an extremely interesting talk and discussion. (*This was carried by acclamation*)

RUSSIAN CONVOYS 1941-45

By CAPTAIN I. M. R. CAMPBELL, D.S.O., R.N.

On Wednesday, 16th January, 1946

REAR-ADMIRAL M. M. DENNY, C.B., C.B.E., in the Chair

THE CHAIRMAN, on introducing the Lecturer, said that no man was more entitled to speak on the subject of Russian Convoys. He had been Captain of the Third Flotilla, in H.M.S. "Milne," and his destroyers were the longest stagers on that run. They ran convoy after convoy and could claim to be the real exponents of the art. The leader of them was Captain Campbell.

LECTURE

FOllowing Hitler's attack on Russia, Britain, and later America, undertook to provide Russia with equipment and war materials. At that time, and indeed right up to mid-1945, the Mediterranean and Black Seas were such active theatres that the only doors into Russia were those in the Far North, the Far East and through Persia. The latter route was limited by inadequate port and rail facilities with a very long oversea and overland haul to Russian centres of distribution. The Vladivostok route was limited, after American entry into the War, to Russian bottoms and again suffered from congestion at entry ports and a still longer overland haul. By comparison the short haul so close behind the northern front was an attractive alternative, however small the volume.

The naval object and task were, therefore, to ensure the safe and timely arrival of convoys at a destination 2,000 miles distant whose route was restricted to the eastward and southward by an enemy-occupied coast and to the westward and northward by ice.¹ The route throughout was subject to U-boat attack and for 1,400 miles could be dominated by the enemy's air force. The enemy coast provided harbours and anchorages from which heavy surface forces could operate at all times. The weather was liable to be severe, and Arctic conditions were an additional factor. The northern latitude also provided extreme variations in the hours of daylight, which was a phenomenon to be turned to good account as will be seen.

The main discharging ports were Murmansk in the Kola Inlet and Archangel in the White Sea. During the years 1941-45 Archangel was closed by ice only in the Winter 1941-42. During other Winters from October-May access was maintained by the use of icebreakers, although the full capacity of the port was naturally reduced. In these periods Ekonomiya and Molotovsk were also used. The fact that Murmansk and Archangel were 500 miles apart was another factor operating against the security of convoys, for preparations prior to sailing and for effecting the junction or separation of Murmansk-White Sea sections of convoys were hard to disguise.

SCALE OF ENEMY ATTACK

SURFACE

The enemy took five or six months to see how effective would be the threat of surface attack by major units on this route, and based the "Tirpitz" on the Norwegian coast when the value of these convoys was appreciated. From the end of 1941 until the end of 1944 one or more heavy units supported by cruisers and/or destroyers were continually present. With similar craft based elsewhere, and

¹See Diagram I.

specially in Atlantic ports, this threat was always greater than its actual face value, because it caused the Home Fleet, in whose sphere of responsibility these convoys lay, to look both ways in case of surface raids on our vital Atlantic shipping.

SUBMARINE

Although enemy naval opinion realized that their best and only chance lay in strangling the Atlantic life line, these supplies to Russia warranted the formation of an Arctic U-boat force. From December, 1941, we see a marked and steady increase in strength which was maintained at a high level right up to the collapse: from 4 to 10 in the early days the figure rose to 36 in 1943 and was seldom less than 20 thereafter.

AIRCRAFT

Discounting reconnaissance and fighter aircraft, we see the overpowering *Luftwaffe* building up its strength from some 120 torpedo-bombers and bomber aircraft in 1941 to the peak of about 250 similar types in 1942. Nowhere was the writing on the wall more clear in showing the inadequacy of the German war machine to its task when it is seen how the *Luftwaffe* began to fail later in 1942 to maintain its scale of attack in these waters. Although these attacks had shown such promise, even this relatively small force could not be maintained at strength in view of the many commitments elsewhere which were eventually to stretch German air resources to breaking point.

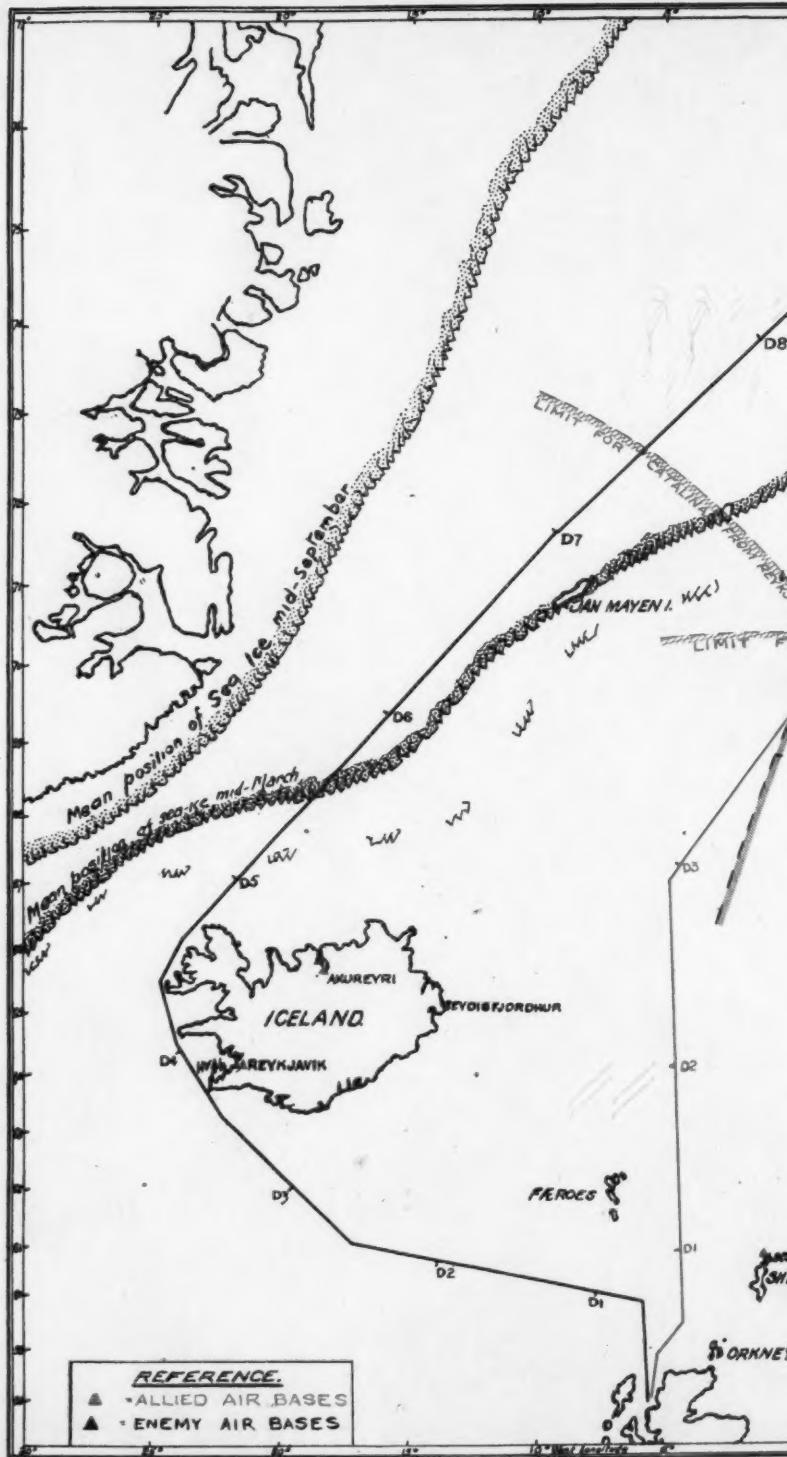
SCALE OF SUPPORT

The main enemy surface threat had to be covered by surface forces of the Home Fleet capital ships, cruisers, and also aircraft carriers when available. The necessity for the Home Fleet having to face both ways has already been referred to, and this meant that supporting forces could only be based in the Orkneys or temporarily in Iceland. To base a permanent force at Kola or in the White Sea was impracticable. The U-boat threat necessitated destroyers for screening heavy ships, and the endurance of the screen, except in emergency, reduced the cruising radius of heavy ships. The air threat within 350 miles of the Norwegian coast was heavy and greater than could be risked normally, observing the overall and increasing requirements for fleet units elsewhere. The normal area from which our heavy ships gave supporting cover to the convoys was therefore well to the West and South of Bear Island.

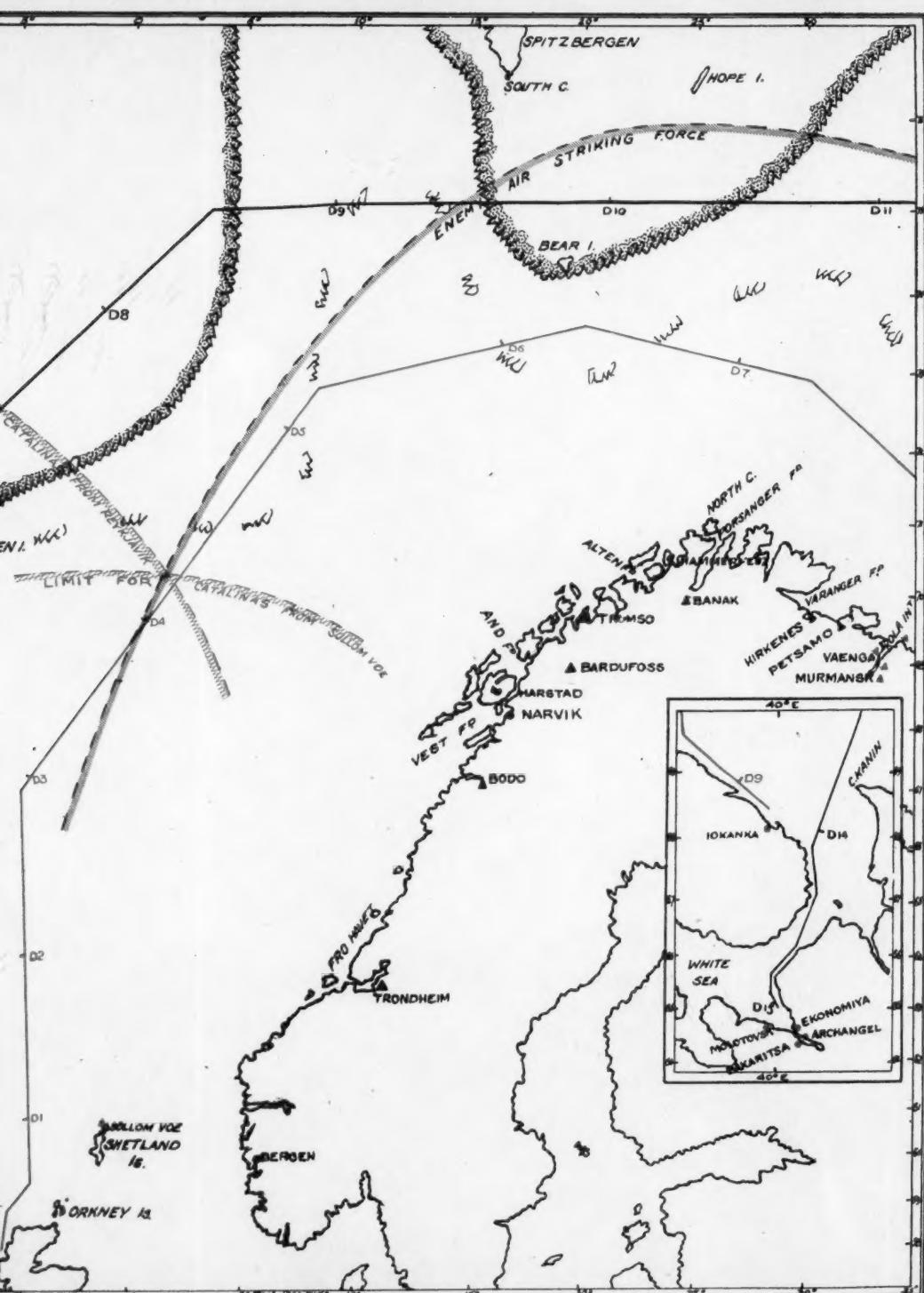
Cruiser support was given usually by one or two ships outside the convoy, relying on their speed for U-boat protection. These cruisers sometimes went right through with the convoys, refuelled, and then provided similar cover for the return convoy. Alternatively, in view of the air threat at Kola, they returned to Iceland for fuel and sailed in time to be within reach of the home convoy before it crossed twenty-five degrees E.

Patrols were established by our own and Russian submarines covering Norwegian coastal areas likely to be used as exits by surface forces proceeding to attack. Several attacks and valuable reports of movements of enemy surface craft were made by these patrols. For instance, the "Trident" torpedoed the "Prince Eugen" on her arrival in Norwegian waters in February, 1942, and a Russian submarine claimed a successful attack on the "Tirpitz" in July of that year although this has never been substantiated.

Coastal Command provided Hudsons, Whitleys, Sunderlands, Catalinas, and later Liberators, for anti-submarine patrols from bases in Scotland, Shetlands, and Iceland in so far as their range allowed. In July, and again in September 1942,



RUSSIA



RUSSIAN CONVOYS 1941-1945

DIAGRAM I.



Catalinas were flown to Russian bases to give cover from seventy degrees to seventy-seven degrees N. which home-based squadrons could not do. For Convoy P.Q.18 an offensive force of torpedo-carrying Hampdens and Spitfires for reconnaissance were also sent to Russia.

ESCORTS

In the Autumn of 1941 and early in 1942 the convoys were small, no considerable surface or U-boat threat had as yet developed, and the nights were long so that aircraft were at a disadvantage. Thus trawlers, whalers and minesweepers were sufficient as escort with a destroyer or two sometimes added. As the scale and forms of attack increased, so were introduced the capital ship and cruiser cover already referred to, while destroyers and corvettes were included to strengthen the close escort. The heavy air attacks required something more than the small ship's unstable gun platform, and C.A.M. ships¹ were included in the convoy together with Anti-Aircraft ships which were also specially converted as such from merchantmen, and eventually also one 5.25 in. gun cruiser within the convoy itself for added gunfire. This constituted a very considerable risk but was amply justified in the event; not one of these A/A cruisers was lost and many a *Lufwaffe* crew are no longer available to testify to their gunpowder.

As an added threat to interference by surface raiders some of the larger convoys included submarines of our own; but this practice was discontinued for it had several disadvantages and at best was rather in the nature of closing the stable door after the event.

The unsuitability and inadequacy of C.A.M. ships for consecutive operations led to the demand for carrier-borne aircraft to provide fighter cover and anti-submarine patrols. The answer was an escort carrier, or two if possible. The first occasion proved their usefulness, but unfortunately it was not until 1944 and 1945 that priority commitments elsewhere allowed the regular inclusion of these C.V.E.s. Again not one of these ships was lost in escort and their use was amply justified for they provided, in conjunction with support groups, the final answer to the U-boat-cum-air attack.

ANNUAL CONVOY CYCLE

As may be seen from Diagram II,² Line 1, the convoys ran in seasonal periods. These cycles were evolved as the result of experience, for the heavy losses liable to be met in the summer period, as instanced in July and September, 1942, were a warning that to hand the enemy everything on a plate would not contribute to our objective. Despite the hazards of weather, convoys were therefore confined to the winter, when darkness offset to some extent the weight of air attacks. The Diagram shows how various expedients were tried in order to get a regular number of ships through. In 1941-42, with supplies just starting and scarce, a number of small convoys were run. When more ships were available the convoys were larger, but less frequent. Other factors affecting the size and frequency of convoys were the availability of escorts, the scale and forms of attack anticipated and the tactics of defence adjudged to give the best results. 1942-43 was the thinnest season, largely due to lack of escorts because of the requirements of the North African campaign.

¹Catapult Aircraft Merchant Ships. These were the forerunners of the Merchant Aircraft Carriers (known as M.A.C. ships) but, unlike the latter, could not land on their aircraft.

²Facing p. 240.

TACTICS OF CONVOY AND ESCORTS

Escorts were a diverse collection of ships which could be made available from other tasks for the required period. They seldom constituted a well-drilled team and it says a lot for basic "common doctrine" and the controlled initiative of Commanding Officers that their tasks were fulfilled so ably. There would be the "through" escorts of destroyers, frigates, minesweepers, corvettes and sometimes trawlers from Western Approaches Command which would join the convoy at the assembly port. These ships were long-legged in endurance, well equipped and trained for A/S though weak in fire power. Later on, off Iceland or the Faroes, would join the Home Fleet contingent of destroyers—not so experienced in A/S work, with shorter endurance but strong in fire power and speed. Here also the A/A cruiser would take her place in the convoy for that eight days, eight-knot trip, giving with her wireless, radar and fire power a confident aspect to the whole, which was only exceeded when an escort carrier, or preferably two, accompanied her.

Needless to say, if security in preparation and execution had been good, the chances were that the convoy passed the latitude of Iceland without the enemy being aware of the sailing. With daylight at a minimum and maintaining strict W/T and R/T silence there was a chance that the convoy would get through altogether undetected, as happened more than once. In any case the longer discovery could be delayed the better for all, for wasps from the ground were quick to seek the jam. Unfortunately the Germans ran very regular meteorological-reconnaissance flights—one to cover the Jan Mayen—Iceland area and the other Bear Island—Spitzbergen, so that any convoy was liable to discovery due to crossing these tramlines through no fault of its own. For many reasons a rather close, almost circular screen was favoured. This kept the convoy together, stragglers being easily detected; permitted visual signalling in clear intervals between fog, snow, hail and spray; gave maximum concentration of fire over the convoy; conserved fuel; while any newcomer detected was certain to be an enemy. This practice did not find favour in all quarters; but in the Atlantic convoys were not exposed to continuous threat of air attack nor usually to surface raids with fuel running low. Nor, in the Atlantic, comparatively far from enemy bases was the slightest squeak on the air liable to such a rapid riposte.

Fleet destroyers were disposed with a view to easy concentration towards any quarter threatened by surface forces, with the A/A cruiser in support. The other escorts were positioned so as to leave the A/S screen intact on departure of the Fleets. The A/A cruiser under air attack usually came out to traverse the front of the convoy in order not to present such a sitting target and to give freedom of manoeuvre for bringing her maximum gunpower to bear.

ESCORT CARRIERS

The escort carriers would normally occupy suitable stations within the convoy unless they were operating their aircraft; then they vacated their billets and steamed appropriate courses within the A/S screen. If they had to break out, the two nearest destroyers went with them to provide A/S protection and to be ready for crashes. The aircraft used were Swordfish, Avenger, Sea Hurricane and Wildcats. The Swordfish, fitted with R.A.T.O.G.¹ and armed with D.C.s² and R.P.s,³ were best for A/S search, patrol and strike; Wildcats for day fighter defence and support of

¹Rocket-Assisted Take-off Gear.

²Depth Charges.

³Rocket Projectiles.

Swordfish A/S strikes. Each carrier had up to twelve Swordfish and eight Wildcats. Anything up to three Swordfish were on patrol at a time with strikes of two Swordfish and one or two Wildcats in support, and by night two Swordfish alone. The 1944/45 season was unique for being the first time continuous night flying was carried out from carriers within a convoy. Fighters operated in sections of two, with one section up when shadowers were about. With air attack expected, two sections were usually up with two or more at instant readiness on deck.

Nothing can exceed the value of and admiration earned by the work of these carriers. The aircraft were operated on a schedule of 12 hours flying and 12 hours maintenance in light varying from full daylight to full dark; with visibility varying from extreme to thick fog or snow; sea from calm to mountainous and in extreme cold and with frozen deck gear. Some ships buckled the fore end of their flying deck, 60 feet above the waterline, and one recorded a green sea rolling the whole length of the flight deck.

SOME RAIDS ON CONVOYS

There is not time to review particular convoys in detail but running through chronologically it will be seen how Arctic convoy experience and practice were built up.

The first two of the larger (for those days) convoys sailed in March, 1942. They were known respectively as P.Q.12 and Q.P.8, and there were fifteen ships in each. The days were lengthening, the ice was down so that the route had to be South of Bear Island, and by now both the "Tirpitz" and the "Scheer" were operating in Northern waters. It seemed certain that the enemy would have a cut at these convoys, and so the Home Fleet provided capital ship, carrier and cruiser support for the first time. The pair of convoys took their departures simultaneously so that the Home Fleet could cover both in the danger area at the same time. The "Tirpitz" did in fact sail from Trondheim, and was sighted and reported by the submarine "Seawolf," placed there for the purpose, and she made North for the convoy routes. She crossed the route between the convoys some three hours after they had passed each other gridiron-fashion in a snowstorm, and came upon and sank a Russian straggler from the Westbound convoy. The "Tirpitz" made no other contact and later turned for home. Admiral Tovey—C. in C. Home Fleet, was well placed to bring her to action should she remain in the area. Although a destroyer sweep failed to locate her, naval aircraft from the carrier "Victorious" did so and an unsuccessful attack was delivered before she could get under the umbrella of shore based fighters.

In the same month three enemy destroyers attempted to raid a convoy (P.Q.13) of nineteen ships, but their only success was to damage the cruiser "Trinidad" by torpedo. In the process the German destroyer Z.26 was sunk. Five ships of the convoy were lost by other forms of attack. The "Trinidad" reached Murmansk for repairs which took six weeks during which time she and her crew, accommodated ashore and in hospital, were subject to bombing attacks and considerable physical discomfort due to makeshift conditions.

P.Q.14 Convoy is worthy of remark because of the toll taken by an elemental enemy in April of that year. Twenty-three ships sailed, became involved in ice when four days out, and fifteen ships had to return.

In April-May 1942, Rear-Admiral Bonham-Carter, commanding the 18th Cruiser Squadron and flying his flag in H.M.S. "Edinburgh," was covering the returning

Convoy Q.P.11 of thirteen ships. As the Convoy had been shadowed by aircraft and U-boats and slowed up by headwinds, the "Edinburgh" cruised in the vicinity up to twenty miles clear. While doing so she was struck by two torpedoes from a U-boat and the damage virtually disabled her. Two destroyers from the Convoy came to her aid and eventually she was joined also by minesweepers and a Russian tug. With a tow *astern* she was making her way to Kola again when three enemy destroyers made contact. In extreme cold and blustering snow squalls a dogfight ensued reminiscent of Kipling's "Three Sealers." Eventually the "Edinburgh" was torpedoed again and had to be sunk by our own forces. The enemy destroyer "Herman Schoeman" was sunk and both the others were damaged. The British destroyers "Forrester" and "Foresight" also suffered considerable damage.

After repairs the "Trinidad," escorted also by the repaired "Foresight" and "Forrester" and two other destroyers, left Kola on 14th May. By the evening four aircraft were shadowing and dive-bombing attacks ensued shortly for an hour followed by torpedo-bomber attacks. In the course of the latter a dive bomber came through the clouds and got two hits on the cruiser. Further torpedo-bomber attacks followed during which the fires in the "Trinidad" got such a hold on the ship that destroyers were ordered alongside and she was sunk by our forces. This was the only H.M. ship loss directly attributable to German aircraft attack during the whole course of these convoys, but these incidents showed the danger to which supporting cruisers acting singly were exposed, and the additional hazards of a damaged vessel seeking repair in the Kola area. This led eventually to acceptance of the risk of an A/A cruiser actually in the Convoy itself and to the provision of at least two supporting cruisers in company within reach but well clear of the Convoy for surface support.

P.Q.17 and Q.P.13, sailing in June-July 1942, were the first of the large convoys of 35 ships each, and their passage stressed afresh the difficulties to be met in the height of Arctic summer. The enemy had by now four major vessels in the North—the "Tirpitz," "Hipper," "Scheer" and "Lutzow." The Home Fleet cover was the strongest yet provided, consisting of the battleships "Duke of York" and the U.S.S. "Washington," the carrier "Victorious," the cruisers "Nigeria," "Manchester," "Cumberland" and a destroyer screen, all under the C.-in-C; also a Cruiser Force under Rear-Admiral Hamilton, including the "London," "Norfolk," and the U.S.S. "Tuscaloosa" and "Wichita," and destroyers. The convoy escort for P.Q.17 was stepped up to six destroyers, two A/A ships, two submarines, three rescue ships, eleven corvettes, minesweepers and trawlers. Convoy Q.P.13 passed without incident to the westward between Bear Island and Jan Mayen but was unfortunate enough to lose an escort and five ships later in our own minefield off Iceland.

Between 2nd and 4th July, although subjected to four separate air attacks and various U-boat attentions, P.Q.17 suffered only one loss. Meanwhile air reconnaissance of the Norwegian coast had failed for several days, until p.m. 3rd July when it was known that the "Tirpitz" and "Hipper" had left Trondheim. Unfortunately the Narvik reconnaissance was again abortive until late on 4th July when the "Scheer" and "Lutzow" were found not to be present. The Convoy being now between 25° and 30°E. the threat of a heavy surface raid with only our much inferior cruiser force in support was so potent that the Admiralty ordered the Convoy to scatter. The German ships were actually on the move and were reported by our submarines and aircraft on 5th July to be rounding North Cape steering N.E. and

later further to the eastward. They never in fact attacked, no doubt for the very reason that the Convoy had dispersed, and they were again sighted turning out of Langfjord, doubtless bound for Narvik. Escorts did what they could, attaching themselves to small groups of ships spread all over the Arctic Sea, some reaching Nova Zembla, Matochkin Strait, and eventually Kola. Meanwhile U-boats and aircraft harried and hunted them, and of the 35 ships which had sailed, by the end of the month only 11 ships all told survived.

By September 1942, the enemy scale of attack was about at its peak in surface and aircraft, and instead of the weak destroyer escort with a group of cruisers in support, the East bound Convoy P.Q.18 of forty ships was accompanied by a very strong destroyer force of sixteen led by the A/A cruiser "Scylla" in which Rear-Admiral Burnett was flying his flag. For the first time an escort carrier, H.M.S. "Avenger," sailed in convoy. She carried twelve Hurricanes and three A/S Swordfish. In order to give each convoy full protection, the Westbound Convoy Q.P.14 was not sailed until P.Q.18 had reached the last lap of its journey, most of the escort then transferring to the homeward Convoy. This made the operation much longer than usual, for in addition the ice barrier allowed of a much more northerly route than usual. Besides oilers in convoy a complicated fuelling plan was necessitated with an oiler force at Lowe Sound in Spitzbergen. Battle-fleet cover was again provided but was restricted as to easterly movement as no carrier was available for air cover over the fleet. For the previous Convoy six Catalinas had been sent to North Russia to give A/S patrol between 70° and 77°N., and for P.Q.18 this force was increased to 13 Catalinas, 23 Hampdens with torpedoes, with 4 Spitfires for reconnaissance purposes.

When P.Q.18 passed Jan Mayen on 6th September the German ships left Narvik and this in fact was all the part they took in this operation. The ball was opened on 10th and 13th by U-boats. Two merchantmen were lost, and several U-boats were attacked. On the afternoon of the 13th, just as Rear-Admiral Burnett with the "Scylla" and six destroyers were joining, after fuelling at Lowe Sound, the first air attacks developed. Three attacks were made at half-hour intervals, the second one by 47 Ju.88's and He.111's with two torpedoes each, being the most dangerous and effective. The attacks were well pressed home and eight ships were lost in as many minutes. At 8.15 p.m. that evening the second eleven delivered a half-hearted attack which was easily repulsed.

The "Avenger's" fighters had been concentrating originally on shooting down shadowers on which their machine guns made small impression, but the previous engagement showed this to have been the wrong policy and that aircraft must be kept ready for dealing primarily with attacking aircraft.

Early next morning a U-boat got one of the tankers and was heavily counter-attacked. Between noon and 2 p.m. no less than four further air attacks developed, a total of some fifty aircraft trying their hand. The principal targets appeared to be the "Scylla" and the "Avenger," though any escort seemed to do. This time fighters were ready and peeled off in all directions. Escorts and A/A ships used more freedom of manoeuvre. One ship only was hit and blew up and three Hurricanes were lost for twenty German aircraft.

Matters settled down then until the dinner hour on the 15th when some twenty-four aircraft delivered sporadic bombing attacks without loss to the Convoy. During these attacks smoke was somewhat dramatically sighted and destroyers licked their

lips for a chance to use their own torpedoes instead of being targets for others. However this turned out only to be two U-boats, one of which was possibly put to sleep.

Catalina aircraft from the British force based in Russia took over A/S patrol on the 17th, which was a heartening sight for the Convoy, but meant for the escorts a change over to Q.P.14 Westbound which they joined next morning. P.Q.18 sailed on with reduced escort, backed up by Russian destroyers, and suffered the loss of one more ship in an attack by some thirty aircraft on the 18th.

The weather was thicker for Q.P.14 and except for shadowers aircraft were not engaged. Three of the Convoy, the destroyer "Somali" and the minesweeper "Leda" succumbed to U-boats.¹ In this operation the enemy sank ten ships by air torpedo, six by U-boat, and two escorts, using some twenty U-boats and all of two hundred aircraft actively engaged against their own loss of two to three U-boats and some forty to fifty aircraft; thirty-nine ships made safe convoy to port.

During January, 1943, the first of a new cycle of pairs of medium fifteen-ship convoys were run, a week apart, at four to five week intervals. It was full winter with no escort carriers or A/A cruisers available. The Home Fleet provided capital ship and cruiser support West of Bear Island, while the cruisers "Sheffield" and "Jamaica" gave through support in the Barents Sea.

Convoy J.W.51A went through without incident and possibly undetected, the escort returning with Convoy R.A.51. Rear-Admiral Burnett, with the "Sheffield" and "Jamaica," after fuelling at Kola, sailed on the 27th to 11°E. to cover J.W.51B, which had sailed from Loch Ewe on the 22nd. This convoy was probably reported by a met-reconnaissance aircraft on the 24th and by a U-boat on the 30th. A gale scattered it on the 28th-29th, after which the fleet minesweeper "Bramble" and the destroyer "Oribi" were despatched to round up stragglers. The "Bramble" was never seen again and the "Oribi" arrived independently at Kola on the 31st having sighted nothing. Not so Captain Sherbrooke in the "Onslow" with four other destroyers, two corvettes and a trawler, for at 8.30 a.m. -on 31st December three enemy destroyers crossed the wake and engaged the "Obdurate" who had gone to investigate them. Leaving the "Achates" and the smaller ships with the convoy, the "Onslow" concentrated the rest, in the process of which she discovered bigger game—to wit the "Hipper." A series of very gallant skirmishes ensued for the next four hours, early in which Captain Sherbrooke was disabled and during which the "Achates" was mortally damaged. At the time of these earlier engagements Admiral Burnett was to the North of the convoy and was delayed by radar contact with a straggler. Steaming South at high speed at 11.30 a.m., he surprised and hit the "Hipper." Driving her off temporarily to the westward he was diverted by three destroyers, one of which the "Sheffield" sank; and pressing on again engaged the "Hipper" and also the "Lutzow." By 12.38 p.m., the intermittent engagement was over, the Germans retiring westward at high speed. To sum up, a German force of one pocket battleship, one large cruiser and six destroyers with the advantage of surprise and initial concentration had been held off for four hours by five destroyers and driven from the scene by two 6 in. gun cruisers without loss to the convoy. Our own losses were the "Achates" and "Bramble."

¹The "Somali" survived the initial torpedo hit but sank later while being towed in increasingly foul weather.

INDEPENDENT SAILINGS

Before leaving 1942 it should be mentioned that owing to the shortage of escorts independent sailings of ships both ways was tried as a means of keeping the flow of supplies moving and to get empty ships back, which latter was a real problem not only on account of shipping shortage but also because of the deterioration of men and ships in severe and primitive conditions in North Russia. Taking advantage of the dark nights during October, November and December, thirteen ships sailed outward, only five of which arrived, while twenty-three sailed for home, of which all but one arrived.

THE SINKING OF THE "SCHARNHORST"

The high light of the 1943-44 season was the sinking of the "Scharnhorst" by forces under Admiral Sir Bruce Fraser, C. in C. Home Fleet. The action itself is outside the scope of this lecture. It was, however, an epic justification of all the careful planning and timings involved over these operations. It gave practical demonstration to convoy escorts and merchant ships of the effectiveness of the covering forces which they never saw themselves and perhaps only half believed in.

Briefly, the double convoy cycle of the year before was still in use. J.W.55A had arrived at Kola and the escorts were returning with R.A.55A. J.W.55B had been shadowed continuously by aircraft and U-boats and when South of Bear Island it was learnt that the "Scharnhorst" and three destroyers were at sea. Convoy R.A.55A was just clear to the West of Bear Island. Rear-Admiral Burnett with the cruisers "Belfast," "Norfolk" and "Sheffield" closed J.W.55B from the North-East while the C. in C. in the "Duke of York" with four destroyers came up from the South-West. On the morning of the 26th Rear-Admiral Burnett finally turned the "Scharnhorst" off the convoy and drove her southwards into the arms of the C. in C. She was sunk that same evening in the presence of the combined forces which had concentrated for that end.

The "Tirpitz" having been disabled by X.E. craft¹ attack in harbour in September, 1943, the destruction of the "Scharnhorst" removed the threat of raids by heavy surface craft, although destroyers still remained. Therefore before the end of this convoy season it was possible to introduce larger single convoys in order to economize escorts which were heavily drawn upon for D-day preparations. An A/A cruiser, one or two escort carriers and one or two Support Groups were included in order to deal with the redoubled U-boat threat anticipated.

These succeeding convoys cannot be treated in detail, but it will be appreciated from the foregoing that each was potentially a major operation and many were packed with incident where escort commanders pitted their wits against individual U-boats and aircraft in a gigantic blind-man's bluff with the price of a vessel sunk if caught off guard. Besides ships already mentioned the main burden of all these operations was borne by the 6th, 8th, 3rd and 17th Destroyer Flotillas and by the Cruisers and Escort Carriers attached to the Home Fleet between the years 1941-1945.

This same type of convoy was re-started as early as August, 1944, for the last season and although plenty of U-boats were present their attacks were largely foiled and heavy U-boat losses were incurred. The *Lufwaffe* attempted a comeback in December, 1944, and again in February, 1945, against Rear-Admiral McGrigor with Convoys R.A.62 and R.A.64. Repeated strikes by up to twenty-five aircraft were

¹Midget Submarines.

made but the vigour of our fighters and the halfheartedness of the attacks combined to their complete lack of success.

U-BOAT TACTICS

U-boat tactics largely followed those dictated by their Atlantic experience. In the early days patrols of two or three would be established which would attack on sight. Later came strengthened patrols which would attempt pack tactics of waiting until several boats were in contact before all attacked. By far the most dangerous gambit was after the advent of the *Schnorkel*¹ towards the end of 1944, when the tendency was to pack the approaches to Kola Inlet. Bold action with air patrols and heavy depth charging and sweeping the area were effective, although we did suffer losses in this period, four escorts and two merchant ships being sunk.

The darkness, weather and icing conditions cannot have made it easy for U-boats, and their predilection for attacking escorts in the later days rather than pressing on to reach the convoy showed a hair-trigger lack of determination. Most of the heavy toll taken was by the magnificent offensive spirit of carrier aircraft in rocket and depth charge attacks on surfaced U-boats trying to gain bearing anything up to twenty miles or more from the convoys. There was at all times effective co-operation between shadowing enemy aircraft homing U-boats on to the Convoys, and if only the U-boats could have got there the story might have been different.

MISCELLANEOUS

FLAGSHIPS

The practice in large convoys previously for a Flag Officer to fly his flag in the A/A Cruiser was varied towards the end of 1944 by the Flag Officer sailing in one of the escort carriers. This was a great success, since the carrier had better "action information accommodation" and, as much of the flying was in borderline weather, he was in a better position to assess risks and to decide the scale of air effort to match rapidly changing conditions.

ENDURANCE

Endurance has been mentioned already and it was an item continually before every escort commander. If the weather was heavy and the convoy hove to, if there were many stragglers to be rounded up or cheered up, if there were many A/S contacts and hunts which meant high speed to chase or to recover station, fuel, especially in Fleet destroyers, was apt to run low. To overcome this, one or more oilers were included in convoys whenever possible. Fuelling at sea with frozen gear and ice on deck was unpleasant, and it was always a nice point for judgment as to whether the risk of smashing the gear in prevailing weather was justified by the necessity to refuel—an opportunity which might not recur. However, there is no actual record of anyone running dry, so perhaps many brows were furrowed in vain.

SUPPORT GROUPS

Much credit must go to the Western Approaches Support Groups which became available, after breaking the back of the Atlantic battle, before the end of the 1943-44 season. Prior to this, escorts had been unable to give U-boats their due; all they could do was to try to shake them off temporarily like a dog at one's trousers. The knowledge that they could now really be hunted was a source of very great satisfaction.

⁽¹⁾ The *Schnorkel* was in effect a breathing pipe which enabled the Diesel engines to be run without surfacing either to propel the U-boat or to charge batteries.—EDITOR.

MINESWEEPERS

One cannot pass on without a word for the minesweepers and trawlers, several of which were lost, who sometimes assisted as escorts on their voyages to and from our White Sea minesweeping force. They were unsuitable for A/S, surface and air attack, yet bore their part with credit and equanimity. Some very fine rescue work was done by the good seamanship of trawlers, which vied with that achieved by rescue ships themselves.

DEBITS AND CREDITS

Though figures are usually dull the transactions during these four convoy seasons are interesting. In forty-odd convoys 792 ships sailed outward, of which 62 were lost; 739 sailed for home, of which 28 were lost. These correspond to a loss of 7.8 per cent. and 3.8 per cent. respectively, as compared with under 1 per cent. for Atlantic Ocean convoys. British and Allied merchant service casualties were 829. The Royal Navy lost two cruisers, six destroyers, three sloops, two frigates, three corvettes and three minesweepers, with 1840 personnel. At this price over three and a half million tons of war material, including fuel oil and aviation spirit, were actually delivered to Russia.

On the enemy side of the account are the losses of the "Tirpitz," the "Scharnhorst," 2 destroyers, 38 U-boats and an unknown number of aircraft. The German claims of our losses in these waters aggregated 210 merchant ships of 1,370,000 tons, and 65 warships including 7 cruisers and 30 destroyers. These claims, absurd as they are, reflect the fact that such operations should not any of them have been possible, for they represent the sort of losses which the enemy, situated as they were, ought to have been able to achieve.

ICE

Ice in any shape or form was always a menace and thanks largely to Captain Denny of the "Kenya," special ice reports were later issued for the information of escorts. The grim blackness in an Arctic night of the water in an ice lead was a lure to be avoided. These leads seemed to promise safety from U-boats but they would end in blind alleys and close in behind and leave one literally in a maze; propeller chips, forepeak and steering trouble were the price paid. The hazards of turning a convoy off the ice edge by light signals in darkness with known U-boats about was preferable to risking such an encounter. Approach to the ice edge or large floes could always be sensed by ice-blink and an intenser cold. Small floes could not be detected easily and to be forty miles clear was best.

Heavy snow and ice on the upper deck and top hamper were dangerous if allowed to accumulate, and once formed increased in bulk very rapidly. Whenever possible all hands had to set to with mauls, picks and chipping hammers, though the latter had little effect. Working parts, muzzles and chases of guns and torpedo tubes were kept ice free by special grease, steam and electric heating and jacketing, which measures on the whole were effective, but meant a lot of additional maintenance.

WEATHER DAMAGE

Weather damage was often severe. In merchantmen deck cargo, tanks, wagons, locomotives, would shift and necessitate return to port. There was very little cargo to bring back from Russia and the light ships with bows ballasted up so as to submerge the propeller became sometimes unmanageable in a bow or beam wind. At least one liberty ship started a midship welded seam and broke in half. Escorts

lost boats, davits and men on many occasions. Eventually destroyers used to leave their boats behind, and flying bridges were fitted in later classes to allow fore and aft traffic. Otherwise on occasions it was necessary to retain "watch on—stop on" conditions in engine and boiler rooms and after gun posts.

CLOTHING

The trouble about warm clothing at sea is to get it light enough not to increase tiredness, supple enough for movement in action, and to keep waterproof. The secret was to wear several layers of loose light clothing with a good wind resisting top coat and trousers, and to avoid sweating or wetting the inner clothing. Luckily it was seldom intensely cold in rough weather unless one was close to and the wind off-shore or ice. The dry cold was bracing provided one kept warm. Washing, except to the neckline, went by the board, and frequent hot drinks with heavy meals gave a satisfactory outlook. Unfortunately wet from weather or from drying or thawing clothes could not be kept off the messdecks, cabins, and messes of small ships, and there were never enough radiators to dry out the damp fog. Sweating of bulkheads was largely overcome by careful insulation, topped off by an asbestos wool preparation applied like plaster on which only a flat paint was allowed. The crews of small ships disliked these conditions heartily, yet their sense of humour and of the ridiculous rose to the occasion.

KOLA INLET

Kola is a barren, stunted-bush, windswept inlet with deep anchorages in poor holding ground. For a small ship to berth alongside a cruiser or at the Red Navy base at Polyarnoe was temporary heaven. It was usually a disturbed period before sailing again, with few oilers and oiling berths spaced miles apart. Convoy conferences, re-ammunitioning and *Praznyks* at the Russian N.H.Q. competed with the desire for sleep. There was a fine Red Navy Club at Polyarnoe where the Russians put on football matches, cinema shows, and on at least one occasion a dance for our ships.

ICELAND

As an officer once said of Hong Kong—"Why, it's Aden with trees on"—so Iceland is a jumble of magnified Gibraltares with ice on—bleak and precipitous with adiabatic winds which never blow true. It has cod, cod-liver oil—which the locals drink by the cupful—and, for those with time and transport, some of the finest salmon rivers and wonderful bird life. Many will again take holiday cruising liners to Iceland and the North Cape to see the golden glint of moonlight on glaciers and the shimmering wonder of the Northern Lights, but there are some who will NOT.

LOCH EWE

Since in 1942, Loch Ewe became the Convoy assembly, departure and arrival port, it is fitting to return there for the end of this lecture. At convoy conferences, with the wind nearly lifting the roof off, convoys were first introduced to escorts. It was good to meet these Merchant Navy officers who presently would form their unwieldy heavy laden ships into a composite squadron and manœuvre, without any facilities for station keeping nor reserve of power, in light or dark, calm or storm, rest or action, with a precision and cohesion to be envied by any fleet. Their job was simply to steam on and on and on, which they did, here as elsewhere, through thick and thin, to their eternal credit and our sincerest admiration.

DISCUSSION

CAPTAIN E. ALTHAM, R.N. : It is interesting to note that the Summer routing route passed very close to Iceland. I wonder if the Lecturer could explain whether that was for navigational or for other reasons.

THE LECTURER : At one time, obviously, the further you could keep your convoys away from the enemy's coast and enemy reconnaissance, the better it was. Therefore you pushed it out as far westward and as far northward as possible.
(The Lecturer explained on the map the various routes taken).

CAPTAIN ALTHAM : My question was prompted by the fact that by going so close to Iceland there was always a possibility of the convoy being sighted from that island—a matter to which great importance was attached by those of us who were responsible for preventing leakage of information to the enemy through telegraph or wireless communications from Iceland.

As a former visitor to North Russian waters, I would be interested if the Lecturer could tell us more about the use made of Archangel. Was it possible to get supplies into Archangel, and so onto the more secure and central railway to the heart of Russia, during the Winter months, and if so, to what extent were ice-breakers able to get those convoys through during the periods of really thick ice ?

THE LECTURER : It had been forecast that there would be great difficulty in getting shipping into Archangel during those periods. In actual fact, the Winter of 1941-42 was the only one during which access could not be kept open to Archangel during the Winter months. From October to May access had to be assisted by ice-breakers. It was a thing the Russians were used to doing in peace time and they always managed it except during the Winter of 1941-42. The capacity of the port was reduced, and as a partial offset to that two subsidiary ports were used in addition to Archangel at that time. They could not take very many ships—I think only about half a dozen each—but they did help out.

CAPTAIN ALTHAM : Were there any convoys which went direct from America to North Russia ?

THE LECTURER : I am not aware of any convoys going direct from America to North Russia. A great deal of American goods and material were transported there in American ships, but they came across to this country and joined up with the convoys at the assembly ports. On many occasions there were more American ships than British in the convoy. Various craft going to North Russia, such as submarine chasers and motor minesweepers, which had been built in America would join up and take advantage of the convoys, but they never went direct and they were always the responsibility of the Home Fleet.

REAR-ADMIRAL THURSFIELD : I see from the Diagram that the "Scheer" apparently disappeared from the area at about the end of 1942 and the "Hipper" in about February, 1943. The "Lutzow" appeared on the scene at about that time and disappeared in December, 1943. Is anything known of the circumstances in which those ships were changed about, and sometimes were in Norway and sometimes not ?

THE LECTURER : I do not think we can say exactly what was in the German Admiralty's mind. On her first visit up there the "Lutzow" grounded directly she arrived and had to go South to refit and dock. She came back again but did not remain ; I think she was probably required for operations in the Eastern Baltic. The "Scheer" did not stay very long ; she did one raid into the Kara Sea and then she also went to her home port ; I think that was very likely due to the German drive to save manpower, or rather, to switch manpower to where it was more urgently required, particularly for U-Boats and possibly for shore service. Much the same, I think, applies to the other ships which only paid short visits there.

As in the previous war, the Germans were very much averse to risking their ships. Their High Command seemed to have been obsessed with the idea that their ships might be damaged or lost through inexpert handling, either against the enemy or against the elements. Eventually they decided to leave North Russia chiefly to the U-Boats and their remaining aircraft.

THE CHAIRMAN

I think Captain Campbell's lecture has been extremely informative and interesting. He might perhaps have pointed out that this job of doing a flank march past 2,000 miles of the enemy's coastline, with no bases of our own, was a very difficult proposition—in fact, one which would not normally be regarded as an operation of war at all. The enemy was ranged along that coastline and he was provided with air bases, U-Boat bases and surface ship bases. He had those three weapons in unlimited quantities. If a convoy wanted to do this flank march past his doorstep, it had to expect to fight its way through. The Commander-in-Chief, Home Fleet, had that as his job. Every convoy was an operation—a military operation of great magnitude. Luckily, the German is not sea-minded and he failed to realize his opportunities. In consequence, what was logically an impossible task was in fact achieved. Little did he know of the loopholes which existed in our plans, and there were many. At times it was impossible for the covering forces to be in position, and if the enemy had struck then the convoy would have been unguarded. However, for some reason, he did not find those loopholes.

One must pay tribute to the Russians at their end. They had no equipment which was really of the right kind for this job. Their destroyers were "short leggers"—much shorter than those which Captain Campbell has been talking about—and consequently they could not operate West of North Cape. Their submarines did an invaluable job off the Norwegian fiords, and I think they did claim to have torpedoed the "Tirpitz." It was not until we transported a Fighter Wing of the R.A.F. to Kola Inlet—where it was operated by the R.A.F. for six weeks and then turned over to the Russians—that the Germans started to ease up on their attacks on Kola Inlet itself, which might well have become untenable in the end, because in that part of the world all the buildings and wharves are made of wood and if you attack them with incendiaries they burn down. The Russians, with their Hurricane fighters, subsequently supported by Kittiwarks, kept the Germans out of the skies over Kola Inlet, which was only 40 miles behind the front line.

Captain Campbell mentioned the word "endurance" several times, referring to the length of time during which a ship can remain at sea, but the real thing which came out was the endurance of the officers and men on the job. A complicated double convoy meant as much as twenty-eight days' steaming for most of the destroyers, in winter or summer, under the conditions he has described. It was a feat of human endurance which had very little equal in the last war, so far as the Navy is concerned, because the sea conditions were so terrible.

Before I close the proceedings, I want to mention that Admiral of the Fleet Sir John Tovey should have been presiding this afternoon. His presence here would have been of great interest because he was Commander-in-Chief, Home Fleet, at the time the great majority of the convoys were run through. Unfortunately, he went sick three days ago and he asked me—at that time his Chief of Staff—to preside in his stead.

The customary votes of thanks to the Lecturer and Chairman were carried by acclamation.

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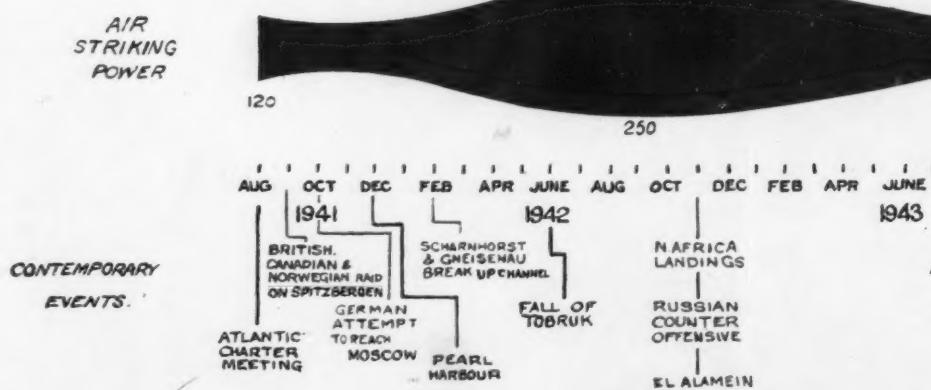
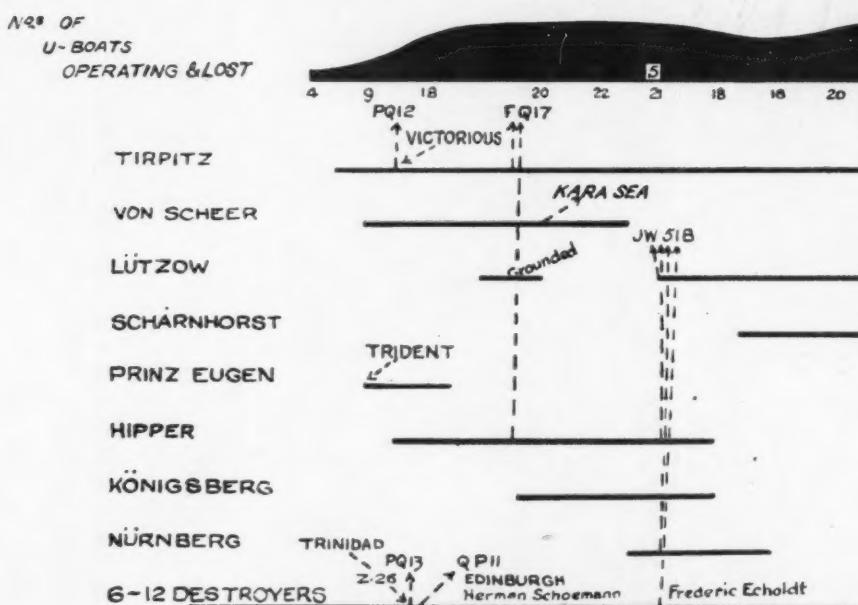
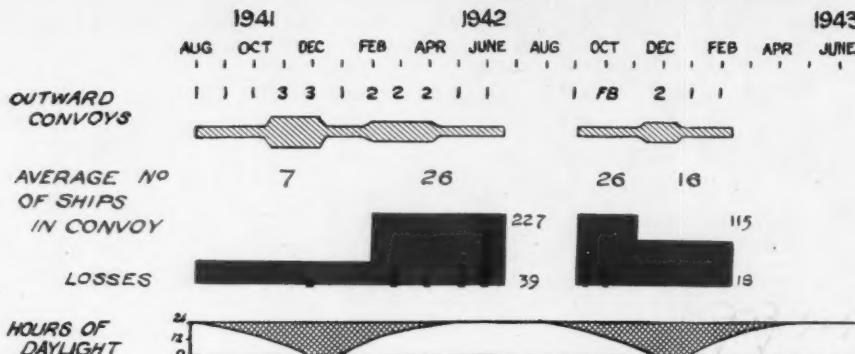
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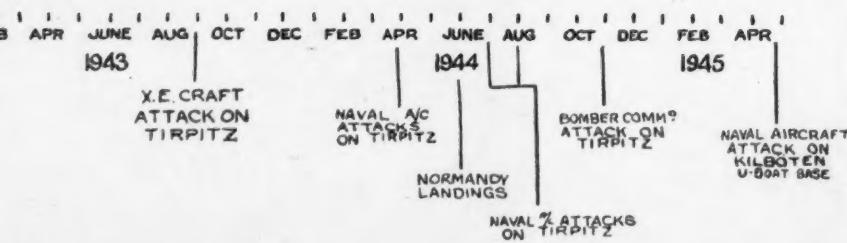
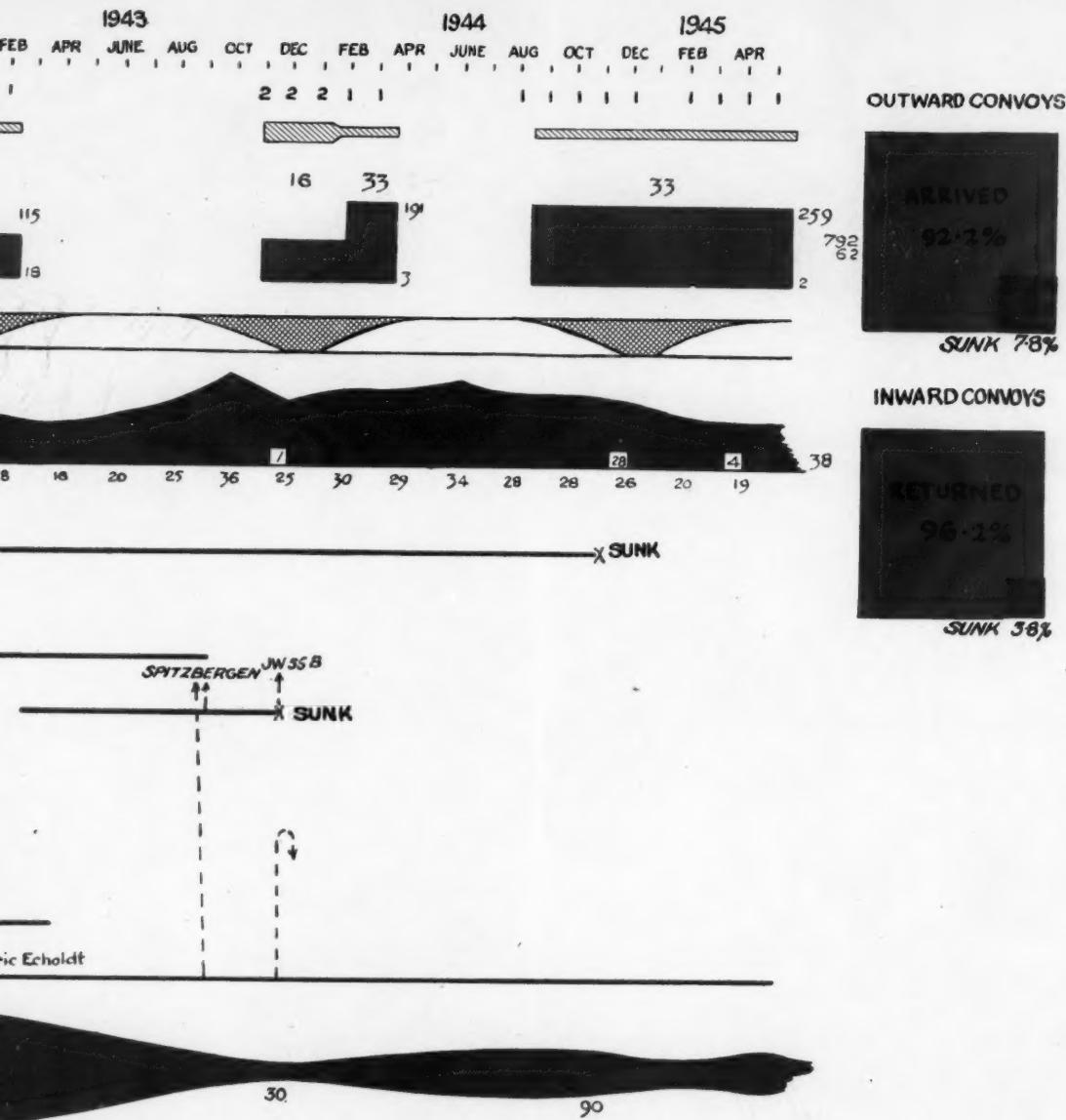


DIAGRAM II



THE WORK OF THE AUXILIARY TERRITORIAL SERVICE IN THE WAR

By CHIEF CONTROLLER DAME LESLIE WHATELEY, D.B.E.

I HAVE been asked to write for the JOURNAL of the R.U.S.I. an account of the work of the Auxiliary Territorial Service in the War; but I find it extremely difficult to condense into a single article the record of the great achievements of a Service which I have watched grow and develop over a period of seven years.

For a start my mind inevitably goes back to the time of the Munich crisis, to the 27th September, 1938, when I amongst thousands of other women listened to the broadcast announcement of the formation of the Auxiliary Territorial Service, and were told recruiting was commencing immediately. The next day I drove into Camberley to see if this were so. It was. A long queue of women were filing past harassed soldiers who, assisted by civilian women, thrust the usual batch of Army Forms into our hands with words to the effect, that if we filled them in and left them, we should hear more later. No information concerning this new Women's Service (and the A.T.S. was the first of all three Women's Services to be formed) could be given us, but undaunted we signed away we knew not what of our heritage and became Volunteers, later to be known as Privates: such was the spirit of patriotism and devotion to our Country. Days went by and in my own case, I heard no more until I received an S.O.S. at about 10 a.m. from a friend at the City of London Territorial Association H.Q. to know if I could get to London by 11.30 a.m. for an interview with the Senior A.T.S. officer who urgently needed officers. Regardless of what pledge I had given at my local Drill Hall, I again leapt into my car and duly reported for interview at Finsbury Barracks where I was asked if I could undertake whole-time duty in what appeared to me to be a perfectly good secretarial post. For this I would receive one pip and the title of Company Assistant, inevitably known in the early days as "Coy. Ass."

I left the Barracks twenty minutes later quite unaware of whether I really was any nearer fulfilling my wish to serve King and Country or not. Fortunately, the second most senior officer came tearing down the stairs and caught me just as I was about to drive away and said, "Can you start next Monday?"—it then being Friday. Jubilantly I said "Of course," and so started my A.T.S. career, which from subsequent conversations with other members was, I think, very typical of how most of us joined up for service with the Army.

Although it can hardly be called an achievement in the strict sense of the word, I feel I must briefly describe how I first came to visit the War Office, for it is symbolical of how, during our first year of existence, we—like "Topsy," just grew up. In the Spring of 1939, we had been given instructions by the War Office that we might send a percentage of our total strength to Summer Camp. I had made the grievous error of sending 2 per cent. too many, and coming of an Army family and suffering from a holy fear of the War Office and our big white chief whom I had never met, I had visions of courts martial, dismissal from the Service and every other degradation a human being could suffer. I decided the only hope (as has always been my maxim) was personal contact, so in more fear and trepidation than words could describe, I braved Whitehall and visited the second Head of our Service. To my intense surprise, she was quite charming, though being almost as ignorant of procedure as the rest of us, immediately communicated her fear for my future to

me. I was told the only way I could put it right was to send 2 per cent. less than our allotment to Camp the following year. On that particular day this presented no difficulties to me whatsoever as, even to my untrained mind, War was imminent and the situation would never arise, and I should not be faced with angry women who could not go to Camp.

To return to our record of achievements. In September, 1938, every County Territorial Association had formed one A.T.S. Company for duty with the R.A.F. In July, 1939, these broke away from the A.T.S. and formed the nucleus of the W.A.A.F.

In September, 1939, the A.T.S. was some 19,000 strong, mobilized, but unaware of what pay they would receive, what scales or schedules had been laid down, if any, for them: an achievement of patriotism if nothing else, for as we took up our war stations it was painfully clear that the military units to whom we were attached regarded us as something in the nature of the curate's egg.

I realized from the outset that our reception would be mixed and it was clear that we were regarded by Army Commanders as an encumbrance or addition and certainly not "in substitution for" soldiers. Later, as the manpower situation became more critical, this attitude on the part of the Army certainly threw an additional burden on those responsible for checking establishments, and was only really corrected at a very much later date when after a great deal of work, all establishments specified military "and/or A.T.S." personnel. However, certainly since Dunkirk those employing A.T.S. have been left with no illusions that we are in substitution and very grateful has the Army been for their female counterpart; the hue and cry over the removal of A.T.S. from military units since demobilization started has more than borne this out. At the outbreak of war we could only be employed as cooks, clerks, drivers, orderlies and storewomen, and yet by 1943 we were carrying out well over a hundred different employments, taking the same trade tests and drawing the same trade rates of pay as soldiers. To enumerate but a few of our multifarious duties:—repairing precision sighting instruments with spiders' webs; all operational instrument numbers in Mixed Batteries, R.A.; Experimental Assistants at the School of Gunnery; Kine-Theodolite; Army Blood Supply Depot; provision of Scrub Typhus Vaccine; innumerable branches of work undertaken by the Royal Corps of Signals; highly secret, confidential and extremely responsible work with the Intelligence Corps, when it was proved that a woman could keep a secret as well as, if not better than, a man. I will be referring again later in more detail to our employments.

The first real outward recognition of their importance to the Country came to the A.T.S. in 1941 when, ceasing to be camp followers, the Defence (Women's Forces) Regulations, 1941, declared the women enrolled in the A.T.S. to be members of the Armed Forces of the Crown; their officers received the King's Commission and certain sections of the Army Act were made applicable to the women. It is here worthy of note that those sections of the Army Act made applicable, only gave very limited powers of punishment, and yet despite this, discipline in the Service, according to records and statistics I have perused up to V.J. Day, has never warranted giving away to the cry from time to time of a very small minority to increase our powers of punishment. The numbers of delinquents were infinitesimal in proportion to our total strength and the granting of increased powers of punishment would, I consider, have re-acted most unfavourably on the goodwill of the vast

majority, had they been introduced during our present terms of Service : I emphasise *present* terms.

We in the A.T.S. proudly claim (and I am very confident that this cannot be challenged) to have given guidance and/or actual training to more Allied Women's Services than any other Service in the world. In the Autumn of 1941, as Deputy Director, I remember having many pleasant and interesting conversations with one of the American Ambassador's secretaries who was collecting data from us to send over to America to assist them in the formation of the Women's American Army Corps. Looking back on these discussions, the point which stands out was my overwhelming desire to point out the difficulties and pitfalls which we had learnt by bitter experience and which they were equally anxious to avoid. Less than two years later I had the privilege of conducting Mrs. Roosevelt and Colonel Oveta Hobby (then Head of the W.A.A.C.) round many A.T.S. Units. It was quite obvious from their questions and conversation generally, that they were deeply impressed by our organization. During 1941, I also had the pleasure of meeting the Norwegian Military Attaché and arranging for the training in our O.C.T.U. of the two Norwegian ladies who were to raise the Norwegian (Army) Women's Service, and at a yet later date inspecting their first unit under training in Scotland. Prior to this, we had already established a close alliance with the French women who had escaped and formed a service for duty with their Navy, Army and Air Force in this country. A large number of their women went to our training centres, and officers to our O.C.T.U. ; indeed their Commandant and her assistants attended a course at our Cadet Wing before starting their service. This alliance has carried on, and up to quite recently their cadets were coming over from France to carry out their officer training at the A.T.S. O.C.T.U. On a recent visit to France, I think their admiration for the A.T.S. was epitomized when I was besought to give approval to their continuing to wear the A.T.S. Lanyard. The Polish Women's Army Service have not only availed themselves of our training facilities in this country and the Middle East, but they have also had one of our senior officers as liaison officer since 1942. This officer taught herself to speak their language within twelve months.

Whilst the Canadian Women's Army Corps were serving in this country, we also had the privilege of training all their officers over here. From 1944 until demobilization was in full swing, the A.T.S. and the C.W.A.C. in Canada exchanged some thirty officers at a time for a three months period. The exchange was strict, that is to say, they were on the posted strength and carried out regimental duty in their sister Service. There is no doubt that both Services derived great benefits from this exchange apart from the enormous pleasure it gave the individual seeing each other's country.

About the same time as this experiment was going on, thanks to that ever wide vision of our Adjutant General, arrangements were made for a limited number of A.T.S. officers to attend the American Staff College at Fort Leavenworth and for the same number of American women to attend our Staff College at Bagshot. Equal benefit was again derived by both Services with perhaps even more far-reaching results in so much as this exchange was of an international character.

To revert to other Women's Services who have seen fit to make us feel "imitation is the sincerest form of flattery," both Australia and New Zealand sent to us for details of our organization and copies of our Regulations.

Apart from the assistance we gave in the formation and training of Dominion and Allied Women's Services, it is worthy of note that well over half a dozen differ-

ent nationalities were serving in the A.T.S. side by side. When I toured in the Middle East I remember one of the most outstanding parades I took was that composed of seven different nationalities with a Basuto band. The credit for the undoubted success of this parade goes to the A.T.S. R.S.M. who had only arrived from our Warrant and N.C.O.'s School three weeks previous to my inspection, and in spite of all the language and temperamental difficulties the parade was certainly well up to standard.

Space will not allow any further details of this side of our activities, but I think I have said enough for it to be realized that our claim to fame in this matter is justified.

The importance of international contact has always been realized by us and for that reason an unofficial document in the form of a News Letter issued by me monthly, has always been distributed to our Allied Women's Services. By this means, both they and the A.T.S. serving overseas have been able to keep in touch with the activities of the A.T.S. all over the world, and thus dispel that "cut off, out-of-the-picture" feeling.

A party was selected for special duty on Mr. Churchill's staff when he went to Casablanca in the Spring of 1943 and many subsequent such missions. This however was the first of its kind and it speaks much for those concerned, that when I interviewed the chosen few I could give them no idea where they were going or indeed that their tasks would even carry them out of this country; all I could say was that its importance was second to none and that if they fell down on the job I should do likewise as Deputy Director, that their parents would probably not hear from them for three weeks as they would be travelling continuously, and in any case the work was of such a secret nature that private communications would not at first be possible. Not only did they volunteer with alacrity but, on their return, their work resulted in the finest testimonial from the then Prime Minister.

This article will not permit any further mention of those selected for special duties all over the world, for they would certainly fill a chapter by themselves.

I want to pay tribute to the achievement of many thousands. Although it would be invidious to say that any one category played a more important part than the other, for we were all cogs in the one gigantic wheel, I feel those who did humdrum jobs day in, day out, with no glamour attached, working unlimited hours during the height of the War before and after "D" Day, do deserve special mention; I refer to our original five employments—the Cooks, Clerks, Orderlies, Drivers and Storewomen. The Cooks for instance, who formed 90 per cent. of the staff of one Army Bakery, who baked and issued 50,000 pounds of bread needed daily by the British Army, A.T.S., R.A.F., and W.A.A.F. and American Army units in this country. Again there were the Cooks who provided meals for about 15,000 men eight times in the 24 hours from a cookhouse which was actually a covered-in concrete tennis court, with six 72-inch coal ranges and a battery of 8/10 farm boilers and an extremely improvised hot-water system. Opinions differed with regard to the court being "covered in" as the roof let in the rain so often and so hard that the cooks and orderlies had to wear boots, sou'westers and rubber coats to work in. In spite of all the discomforts, they were always cheerful—happy in the knowledge that they were in their own way helping to win the War.

Then there were the A.T.S. Postal Sorters, who at one time were handling 8,000

letters a day—letters addressed to men serving in hundreds of different units in Britain or anywhere overseas.

It was upon the devotion to duty of the thousands of A.T.S. clerks that the pay and records of so many more thousands of soldiers has depended.

The work of the orderlies was monotonous, but their spirit was evinced by their invariable custom of singing to the accompaniment of scrubbing brush or dish washing, and their courage and achievements in improvisation certainly stood out during blitzes. How much more uncomfortable life might have been during the war years without this gallant band—in fact we could not have done without them.

The drivers of utility vans, 3-ton lorries, ambulances, motor bicycles or staff cars, were responsible for the maintenance of their vehicles, not only in running order but in first-class condition. Their heroism and steadfastness to duty, driving both in convoy and singly during the raids, certainly gives the lie to the old-fashioned idea of women being the weaker sex.

Thousands of storewomen replaced men of the R.A.O.C., and their work involving an infinite variety of jobs in the vast Army stores all over Britain should not be forgotten. To cite but one instance of their contribution to the War effort—in ammunition repair shop depots alone the A.T.S. had saved the country well over a million pounds by the middle of 1943.

This short record of the A.T.S. contribution in only five employments does, I think, more than justify the decision to augment our employments by over a hundred others, but I only have space to mention two of them in any sort of detail. The work done by the women in manning the instruments with the Royal Artillery— instruments vital to the anti-aircraft defence of this country, is almost too well known for me to write about, for the employment of A.T.S. on these operational duties aroused more discussion and speculation in the country than any other activity women undertook in the War. Suffice it to say, their greatest test and triumph came with the flying bomb attacks in 1944, at which time A.T.S. formed more than half the total strength of A.A. Command under General Sir Frederick Pile. They were stationed all along the East, South-East and South Coasts in most uncomfortable conditions under canvas, until well into the Autumn.

Lastly, on the subject of employments, there was one which until last Autumn was too secret for any information to be divulged. I refer to the A.T.S. who were responsible for producing scrub typhus vaccine. The method of manufacture required the use of large numbers of cotton rats. These rats are indigenous in the Southern States of North America (Louisiana, etc.), and in order to establish breeding colonies in this country and get sufficient animals for production of the first batches of vaccine, cotton rats had to be obtained from the United States. Weekly shipments were sent by air across the Atlantic in specially heated aircraft, these consignments having the highest priority and the secret code name of Tyburn. It was arranged that A.T.S. volunteers, with a nucleus of R.A.M.C. laboratory technicians, should carry out the work under the supervision of civilian and military medical officers. So successful was the selection of Auxiliaries for this highly specialized work, that out of the 85 chosen only two were found unsuitable. All of them received a course of immunizing injections before work on scrub typhus commenced. Half the Auxiliaries were employed in the Animal Houses; these were specially heated and the Auxiliaries employed there wore cellular shirts and slacks mosquito. Each Auxiliary had charge of a battery of cages, the animals being fed and watered daily. Meticulous records were kept of each rat;

some of them were very tame and, as well as being allotted a number, were given a name such as "Beautiful" and "Robert." Seven R.A.M.C. technicians and forty-one Auxiliaries were employed in the laboratories. Owing to the high risk to which all of them were exposed in the preparation of the vaccine, it was necessary to impose a strict routine. Auxiliaries on entering the laboratory changed their outer garments and in addition donned laboratory gown, cap, mask and goggles. The work required a high degree of intelligence, patience and exactness ; it was entirely foreign to the majority who at first were bewildered by the many technical terms used. However, in the six months in which they have been employed as laboratory assistants they have reached an extraordinarily high standard of efficiency. It was possible to ship to the Far East, 100,000 doses of the vaccine by the date required. The end of hostilities there has removed the urgent demand for the vaccine and large scale production is therefore ceasing and the Tyburn Company has been disbanded. I am glad to be able to record that only one other rank fell a victim to the disease and she made a good recovery.

To sum up : on 3rd September, 1939, we had no training establishments whatsoever ; there were 18,961 other ranks, untrained as far as the Army was concerned and 771 inexperienced officers, of whom the majority had only had one week's course ; and yet by September, 1943, we were 206,274 other ranks and 6,201 officers strong with 17 Recruit Training Centres, a Warrant and Non-Commissioned Officers School for 500 students, two O.C.T.U.'s and a Junior and Senior Officers School—all staffed by A.T.S. instructors. We were serving throughout the United Kingdom, Middle East, North and East Africa and in the United States, and at a later date in France, Belgium, Norway, Germany, North and South Caribbeans and India ; 215,000 of us—a force larger than our regular peace-time Army.

We cannot, of course, claim anything like all the kudos for this achievement as, despite the suspicion or perhaps I should say caution with which the Army regarded us in our infancy, a complete change of front seemed to appear after our men returned from Dunkirk, and we received assistance and kindness for which I can never express our adequate gratitude. Some of the A.T.S. had, of course, by then served with the B.E.F., and the majority who were still in this country worked literally day and night, officers and other ranks alike, to feed and re-equip the soldiers. It is, therefore, to the Army Council and never-failing help and wise guidance of our Adjutant-General, General Sir Ronald Adam, in particular, that we owe our change of status from amateur to professional. The one achievement, however, for which we, the A.T.S. do claim all the kudos is that, in spite of all the adverse criticism and the forecasts to the contrary by the public in our early days, we are emerging from the Service as women, and very feminine women at that. This is proved by the demand on the Army Educational authorities for Domestic Science and Mothercraft courses—if further proof be needed than the marriage rate since V.E. Day.

I trust this short chronicle of A.T.S. activities during the War will impress readers as much as their work deserves, but I also hope the fact emerges that from the manpower angle, had A.T.S. been properly trained before the War we could have been much more use to the Army and indeed saved them the burden of teaching us in those early critical days when every single available soldier was needed for vital duties which could not be performed by women.

It will be a fitting end to this short record to repeat the words used in his tribute

to the A.T.S. by Mr. J. J. Lawson, Secretary of State for War, in the House of Commons on 14th March:—

"Before I leave the achievements of the Army in the past and its present duties, to look into the future, I should like to say something of the remarkable work done throughout the War by the A.T.S., the first of the Women's Services. The A.T.S. certainly struck the imagination of the world, and they have helped to train the women's forces of France, Holland, Sweden, Norway, Canada and India. At their peak, there were 215,000 of them—a number considerably in advance of the whole Army seven years ago. They carried out a great range of duties in an exemplary manner. By their willing acceptance of work which, until the War, had been thought beyond their powers, they made a real and indeed invaluable contribution to victory. It would be invidious to single out any one branch of their activities for special mention. They have worked as members of A.A. batteries, as skilled telephonists, and radio operators, as drivers, as clerks, or as cooks and orderlies. Their work has been marked by a cheerful acceptance of hardship, difficulties and, on occasion, danger, which has won the admiration of all ranks of the Army. I hope that the A.T.S. will remain, in one form or another, a permanent part of His Majesty's Forces, and I know that, if they do, they will continue to render the same outstanding service to the country as they have in the past."

A HISTORY BOOK OF THE AEROPLANE

A REVIEW ARTICLE

By GROUP CAPTAIN G. W. WILLIAMSON, O.B.E., M.C.

THE reappearance of *Jane's All the World's Aircraft*¹ is most welcome, for it is an assurance that the pre-war series of aeroplane-history books is to be continued. How great have been the developments since this publication first appeared is emphasized by comparing the latest edition with the modest little volume of thirty-four years ago.

The transitional period between war and peace has not yet permitted of coherent or complete recording in the orderly arrangement of days gone by; but the information has been brought up-to-date of 1st September, 1945. The book was ready for press when Germany surrendered, and it was rightly decided to postpone publication until the Air Ministry should make available the latest authoritative material, both British and German, necessarily kept secret during the War. By the time this was ready, Japan surrendered and production was too advanced to permit of all the new text and illustrations being incorporated in their proper place; so the very latest information appears in Addenda pages ahead of the aeroplane section. Otherwise the compilation is on the same lines as in previous years: a historical review of military air services of all nations during 1944-45 together with an account of their organization, and the addresses of all departments and commands; a similar record of civil aviation, with the names and addresses of aeronautical departments, associations, publications, transport companies, flying clubs and schools, for all nations; details and illustrations of all the world's aircraft; and similar information for all the engines.

But this volume essentially marks the end of an epoch—a period of more than thirty years in which the nations prepared for war, slowly at first and solely at the last; and almost every aircraft and engine described in the book was designed and built for military purposes. In a telling article entitled "Victory," Mr. J. M. Spaight explains how and why that epoch came to an end. The dramatic succession of its concentrated historical episodes make it more exciting to read than any detective story. To select only one phrase, it describes the effect of 47,000 tons of bombs on Berlin as "a sight which grips one with fear." Alluding to the destruction of German aircraft in the factories, in the air, and on the ground, he says, "the destruction of 396 aircraft in one day stood as the record for less than a week. On 16th April, 1945, at least 827 enemy aircraft were destroyed . . . it was for all practical purposes the end of the *Luftwaffe*." On D-day, we read, Allied aircraft flew 13,000 sorties, and maintained a giant umbrella 600 miles square from Le Havre to Cherbourg, with 200 aircraft always in the air; on one day in 1944 rocket-firing Typhoons put 135 tanks out of action; the devastation of French and German railway yards and bridges is described—"the railways of Germany are built for all forms of war except bombing." The campaign against Germany's oil, the raid on Peenemuende in which the head rocket scientist and many of his staff were killed, the attacks on rocket and flying bomb sites, and the sinking of the *Tirpitz* are only some of the epics of war from the air in Europe referred to.

¹ *Jane's All the World's Aircraft*, 1945-46, compiled and edited by Leonard Bridgman (Sampson, Low, Marston and Co., Ltd.) £3 3s. od.

In the East, amongst other resounding successes, American naval airmen off Formosa sank or damaged sixty-three ships, thirty-five small craft, and destroyed 398 aircraft in two days, for the loss of forty-five American aircraft. "The Japanese made the usual fantastic claims to a great victory in this encounter, and apparently misled by their own propaganda, sent out another naval force to mop up the "survivors"; it was met by the American Third Fleet, which sank or damaged fifty-eight ships, and destroyed 171 aircraft."

In the section devoted to Service Aviation, the long articles on the achievements of the British Commonwealth of Nations are even more detailed and equally thrilling. Bomber Command dropped 525,000 tons of bombs, or more than twice the weight dropped in the first four and a quarter years of war; the greatest weight dropped in twenty-four hours was 10,300 tons. There is a fine picture of the 22,000 pound bomb, thirty-five feet long.

The 1944-45 Civil Aviation Section opens with the International Civil Aviation Conference, attended by the representatives of fifty-two nations. An International Civil Aviation Organization, provisional for not more than three years and then permanent, was set up. The various conventions and agreements included codes of operation for aircraft and personnel, health and safety rules, duties, customs and immigration methods, navigation facilities, communications, airports, rules of the air, registration, maps, and investigation of accidents.

The central section of the book—that dealing with aircraft, does not provide anything sensational for developments have followed the lines forecast by previous volumes: bombers have grown bigger, and fighters faster. The Boeing Super-Fortress spans 140 feet and weighs 135,000 pounds gross, as compared with the Avro Lincoln of 120 feet and 75,000 pounds. The Short Shetland flying boat and Boeing Clipper both span about 150 feet and weigh 150,000 pounds, but with four Bristol Centaurus engines the Shetland will have nearly twice the take-off horsepower of the Clipper. Apart from the jet-planes, perhaps the fastest fighter is the De Havilland Hornet with more than 470 miles per hour, but using over 4,000 H.P. in its two Merlins. After that the Supermarine Spitfire, Seafire, Spiteful and Seafang with about half the horsepower, all exceed 450 miles per hour. With the Fairchild Ranger engine of only 575 H.P. there is a Bell wooden fighter which is stated to have a speed of more than 400 miles per hour.

The jet fighters begin with speeds of 550 miles an hour upwards. When the world's record was made by the Gloster Meteor at 606 miles an hour, the engines were running at less than 90 per cent. of full throttle. British and American jet-planes are beautifully streamlined; they include the De Havilland Vampire made by English Electric with the De Havilland Goblin engine, the Gloster Meteor with various types of Rolls-Royce engines, the Bell Airacomet with two Whittle-type turbines made by the General Electric Company of America, and Lockheed Shooting Star with one of these engines provided with a large intake on either side of the fuselage.

German jet-planes, on the other hand, are hideous monstrosities; perhaps every aerodynamically-minded designer was sent to a concentration camp! One has a gas turbine, looking like an old dustbin, hung loosely along either side of the fuselage towards the nose, with an ugly pair of swept-forward wings sprouting further aft; another has two such dustbins hanging beneath each wing; and even when only one turbine has to be accommodated, it sits on top of the fuselage like the propulsive duct of the flying bomb.

Interim civil aircraft of a sort have been produced from modifications of the Armstrong Albemarle, Handley Page Halifax, Short Stirling, and the Avro Lancaster—the latter in the shape of the famous Lancastrian, able to fly from London to New Zealand in about sixty hours. All have the disadvantage of the ex-bomber's long, slender fuselage. The Avro York is a graceful airliner of the new breed. The Avro Tudor and Handley Page Hermes, both with pressure cabins, are still more up-to-date. On the stocks there is a Bristol 167, at one time popularly known as the Brabazon, which spans 230 feet and will weigh a quarter of a million pounds.

A number of American helicopters are described and illustrated ; the one being built in this country by Bristol is mentioned.

AERO ENGINES

The engine section shows that we have reached what Mr. Winston Churchill would call "a grand climacteric" in engine development : huge and complex reciprocating engines such as the Bristol Centaurus, Napier Sabre, Allison V.3420, and Pratt and Whitney Wasp Major produce about 3,000 H.P. as a maximum for a weight of about one pound per horsepower ; but the same horsepower could be produced, at any speed above 375 miles per hour, by an internal combustion turbine weighing less than half-pound per horsepower, using propeller or jet, or both, as a means of propulsion. Nevertheless piston engines will be used for more than ten years to come for small and medium sized aircraft, other than those intended to exceed 450 miles per hour, at which speed the jet becomes more efficient than the propeller.

While Europe has concentrated on inverted in line engines, America has developed the small radial, and what is more remarkable, a number of opposed-cylinder engines of light horsepower which will suit what might be termed the "skycycle" aircraft. Continental Motors make flat twin engines ranging from only 65 H.P. to 140 H.P., and a radial of about 220 H.P. Franklin (now styled Air-Cooled Motors Corporation), Kinner, and Lycoming produce similar opposed-cylinder engines. The Ranger Engine Division of Fairchild make a range of inverted in-line aircooled of less than 200 H.P.

The availability of these small, light, opposed-cylinder engines has automatically resulted in their being used for the several types of helicopter made by American firms. With very little alteration, the flat opposed-cylinder engine can be run with its crankshaft vertical ; and the aircooling resulting from forward speed can be replaced by a fan, geared or otherwise, below the lifting airscrew. Lycoming and Kinner both make helicopter engines of this type.

The Guiberson Diesel is mentioned ; but with the arrival of high octane fuels and higher compression, together giving less weight per horsepower and greater efficiency, the Diesel engine will no longer lie in the main line of engine development.

At the other end of the scale there are the great engines developing a maximum of 3,000 H.P. though this information was not available when the book was printed ; some, like Bristol Centaurus, are air cooled ; the Rolls-Royce Griffon is now stated to have a three-speed supercharger ; Napier Sabre with its twenty-four cylinders, and Pratt and Whitney Wasp Major with twenty-eight aircooled cylinders in four rows, or the Allison twenty-four cylinder liquid cooled engine, reach what is probably the limit of complexity. Sabre and the Allison V.3420 have two crankshafts each ; Sabre and Centaurus are sleeve-valved.

An even larger engine, not necessarily ever used in aircraft, was developed (or was under development when the War ended) by the German firm styled B.M.W.—the *Bayerische Motoren Werke Flugmotorenbau G.B.H.M.* It looked like two 14-cylinder engines back to back; the shaft of one engine rotated in a direction opposite to that of the other; the engine was intended to drive a contra-rotating propeller. The maximum output of the combination, of total capacity of 83.5 litres, is stated to be 3,900 H.P. for take-off.

Compared with these complex monsters, the simplicity of the gas turbine is remarkable. The book provides description and illustration of every known type, whether made in this country or abroad.

GAS TURBINES

The development of the gas turbine draws attention to the comparative inefficiency of the four-stroke engine which has served aviation so well and so long. Only one stroke in four is a power stroke, and the reciprocating engine is therefore four times as heavy as if the flow of power were continuous, as in the turbine. While the power-weight ratio of the turbine is not yet, at speeds within our reach, four times as good as that of the piston engine, it is well over three times as good at the speed of the Gloster Meteor's 600 miles per hour. That is to say the turbine weighs only one-third as much as piston engines of comparable horsepower.

For some of the gas turbines the thrust is stated; we shall doubtless become accustomed to thinking in terms of thrust instead of horsepower, and our mental arithmetic may be eased by the fact that at 375 miles per hour one pound of thrust is equal to one horsepower. The turbine horsepower increases directly as the speed, and at 750 miles per hour, when that speed is attained, one pound of thrust will be equivalent to two horsepower. The Annual gives the thrust of the De Havilland Goblin as 3,000 pounds at about 10,000 revolutions—a figure which is rendered obsolete by the speed of gas turbine development. But supposing that it were still correct, this thrust at the 540 miles an hour of the De Havilland Vampire provides 4,200 horsepower at the jet, for a stated weight of 1,500 pounds dry.

Readers will be interested in the details of the type of Rolls-Royce engines fitted to the record-breaking Gloster Meteor. The latest to be described is the Nene, which gives 5,000 pounds thrust at 12,400 revolutions per minute, equivalent to 8,000 horsepower per engine. To drive the Meteor at the same speed we should require not less than six engines of the Bristol Centaurus or Napier Sabre size—which is absurd. It is absurd not only on account of weight and installation difficulties, but because of the catastrophic falling-off in the efficiency of the propeller at speeds above 500 miles per hour. At these speeds the tip speed of the propeller is greater than the speed of sound—750 miles per hour, and this results in the development of shock waves and turbulence of a type which together waste an increasing proportion of the horsepower developed by the engine. Therefore, for high speeds we must use jets, and for jets we need gas turbines.

But below those speeds, there is no reason why gas turbines should not drive propellers; at lower speeds than 500 miles per hour the propeller becomes far more efficient than the jet; and the Armstrong-Siddeley ASP and Bristol Theseus turbines were specially built for propeller drive, also the Rolls-Royce Trent. It is stated that two Trent turbines, fitted with five-blade propellers, have been flown in a Gloster Meteor, each developing 750 shaft horsepower. The ASP develops no less than 3,600 shaft horsepower for a dry weight of 1,900 pounds—figures that show that the day of the big piston engine at one pound per horsepower is ending, even for propeller drive.

The gas turbines described are of various types. They differ in the direction of compressor airflow, and the direction of the airflow through the combustion chamber to the turbine. Compressors are either centrifugal, in which the air enters at the centre and is flung out to the tips of the fans or blades, or axial, where the flow is parallel to the shaft, as in the airstream of an electric fan. The axial flow compressor has blades similar to those of a turbine, and like a turbine may have several series of blades, or stages. From the compressor, the airflow may go straight through to the turbine, with the fuel jets facing the same way; or it may turn back upon itself, and have jets pointing in the opposite direction to the air as it comes from the compressor. The latter is styled "the reverse flow type."

Of the British turbines, the Armstrong-Siddeley is stated to be axial flow compressor and reverse flow combustion; Bristol Theseus combines axial and centrifugal compression; Rolls-Royce engines are centrifugal compression and straight flow combustion.

In a single phrase, buried amongst a mass of data, it is revealed that the life between overhauls of British turbines exceeds five hundred hours—a figure which compares favourably with the piston engine. Though this book does not state it, from other sources it is known that the life of the German turbines was less than one-tenth of this amount, probably on account of metallurgical difficulties. The rotor was then removed and replaced by a spare, the old one being overhauled by semi-skilled mechanics, chiefly women and forced labour from occupied countries.

There is a good account of the rocket weapons. The flying bomb or "doodle bug" was not a rocket, but an internal combustion engine of novel form. We are here told its scientific name, "athodyd," which probably stands for aerial thermodynamic duct, i.e., the tube in which combustion took place.

German turbines were all of the axial flow type, as compared with the centrifugal compressor favoured by Air Commodore Whittle. Those produced by B.M.W. were very large, one delivering 15,000 horsepower at 550 miles an hour, or 7,700 if applied to a propeller. Sir Roy Fedden brought, on behalf of M.A.P., some parts of this huge turbine to this country; it may never have been completed.

Two pages are devoted to German power boosting systems. Conscious, perhaps, of technical inferiority in the later stages of the War, German inventors produced several ideas for the boosting of horsepower by the injection of various fluids into the air intake. These included methanol and water in about 50 per cent. proportions, ethanol and water, water alone, nitrous oxide, and injection of 96 octane petrol. As much as a 15 per cent. increase in horsepower was obtained over very short periods, often at the cost of shortening the life of the engine. The increase in horsepower is stated to be due more to the cooling of the charge than any particular efficacy of the mixture.

This historical record would be greatly improved by an index which, amongst other useful purposes, would enable us to locate which engines or propellers are used in which airframes, or the name of the aircraft which has Lockheed undercarriage retracted by Dowty hydraulics. There are, too, some minor errors overlooked in proof-reading, but these shortcomings may well be forgiven with an editor who produced this huge volume ". . . . in spare time left over from full employment elsewhere." With him we shall "look forward to the production of the next edition, the first for six years which will be free from the hindrances, frustrations, disappointments, and, one may even be tempted to hope, the shortages of wartime publication."

THE LOWER DECK OF THE FUTURE

By **LIEUTENANT-COMMANDER G. F. AGUTTER, R.N.**

"The Old Order changeth, yielding place to new"

HAVING commissioned twice within the last year of the War from what is termed "Station Resources," which in those times of man-power shortage was equivalent to receiving a collation of approximately the correct numbers of non-substantive ratings, considerably overspiced with other ship's misfits and habitual deserters, one had much food for thought. Ruminating upon the bridge whilst the ship's company were turning out—those that could sleep upon the upper deck—a hundred small indications showed that these men, although five years in uniform, did not know how to live on board ship. Their own ignorance and inadaptability were the root of their discontent. During the War it was possible to give only the barest specialist training and little else before drafting the "bodies" to sea. This tended towards a ship's company becoming a conglomeration of cliques housed in a common Ark, uncomfortable because they had not been ship-trained.

The old order is dead. It is doubtful if the pre-war Navy could be re-created, even were it completely desirable. After a ten-year interval the Lower Deck—to use the traditional term—will have a different mentality. With the need for more technicians and a greater variety of non-substantive ratings, which is one of the heritages of the War, there is, however, a danger that training in their specialist branch only will be considered at the expense of the well-being of the Navy as a whole. Common endeavour for the good of the ship and the Service, which is the essence of naval discipline, cannot flourish amongst a collection of mixed tradesmen, all metaphorically "going home to tea" after working hours. The post-war Navy, to be efficient, must be a Service contented to live afloat and not one composed of those to whom time at sea or abroad is a purgatory to be avoided with guile. Pay is not everything. If sufficiently high, it will attract; but the disgruntled man will not give that little extra beyond his working hours which in the Service is so desirable from the highest to the lowest.

THE ADVANTAGES OF COMMON ENTRY

Is there any peculiar reason why only seamen should join the Navy at an early age? The stoker joins at any age between 18 and 24, by which time he has probably tried and, perhaps, failed in civilian employment. Let us suppose that all embryo naval ratings have a common origin in a similar Training Establishment where good order and cleanliness can be instilled into them at an early age. The Engineering Artificer-to-be will suffer no harm from having sailed a boat in company with a future Gunner's Mate; he will realize that he is of the Navy firstly and an Artificer second and only after his later training and proved mechanical ability. If all branches were recruited at the age of 15 and given a general training on the lines of the pre-war Shotley for a year, then at the age of 16 we should have a Boy fit and ready to specialize in any one of the various branches required. Setting aside the moral value of an early common training, good food and plenty of games between the ages of 15 and 16 would produce a better physical average throughout the Service. Inter-Establishment athletic contests, appropriately reported in the Press, coupled with good holidays during which the boys should be paid Leave Allowance so that they can "cut a bit of a dash" before their less fortunate contemporaries locally, would ensure that there would be no lack of recruits.

At the age of 16 it is desirable that these Boys should be given a cruise—say four months—in a training squadron with the object of demonstrating to them the interdependence of the various branches afloat, and of providing a final period of selection. The allocation to branches should not be made before the completion of this period. Let all have a spell in the engineroom of a pitching ship and a trick as look-out in a hailstorm: such experiences will not be wasted in after life afloat. The Shipwright will have all the better understanding of the fragility of a boat's stempiece for having smashed one, and the embryo Electrical Artificer, after a week's duty as Cook's Mate in the tropics will appreciate the need for adequately serviced fans. Furthermore, those selected for specialist trades will be able, in the light of their early experiences, to appreciate better their later training.

Having obtained the basis for mutual understanding between branches and a grounding in how to live happily afloat, the separation should be made according to the percentage requirements of each branch. The actual preference of each Boy should not be considered unduly. Those selected as likely to make good officers, including candidates for the Naval Air Arm, should appear before a Selection Board. Artificer and Artisan Branches, Writer and Stores Ratings, Cooks, Radio Mechanics and Aircraftsmen designate, will say goodbye to the sea for the prescribed period of their further training; but they will be more apt pupils for possessing a knowledge of what their future life is to be.

There remain the Communication Boys, Seamen Boys—from whom after qualifying as seamen the Radar and Submarine Detector Ratings will be subsequently drawn, and Boy Stokers. These should be drafted to seagoing ships and should be messed together and subjected to wise restrictions as to leave. The Boy Stoker—a rating which does not yet exist in the Navy—could be usefully attached to his Department during working hours until rated Stoker 2nd Class on attaining the age of 18. The author is convinced that Stokers so trained would prove decidedly superior to the present entry.

In so far as it is possible, taking into consideration the disposition of the post-war Fleet, it is desirable that a rating's first commission afloat should be abroad. The moulding of character, self reliance and independence of the young rating are better built up far removed from the often unsettling visits to his home, which could be made during his seasonal leave thrice annually in the Home Fleet.

PERIOD OF ENGAGEMENT

No youth can be absolutely confident that he is going to be really happy in the Navy; but the earlier he joins, when his character, mode of life and physique can be built up the right way, the greater are his chances of contentment. Twelve years—man's time, as a first period, is too long. The majority of men who were not proposing to re-engage, had, in my experience, made up their minds well before the age of 30. They were "rolling on their twelve" and were for the most part disinterested; from the point of view of higher training they were a waste of money to retain. Others drifted through their "twelve," cluttering up the space that might have housed keener men. If the first period were reduced to six years, enlistment would be stimulated because six seems much less irrevocable than twelve. Further, the men going "outside" at the age of 24 would be better placed to find useful employment.

As regards the second period of engagement, assuming the man is recommended, he should be permitted to sign on for a further period of twelve years on completion of which—at 36 years of age—he should be eligible for a pension. If, however, he is

still physically fit and active, and his services are required, he should be allowed to remain a further six years and retire at 42 with a slightly higher pension. This would enable experienced and knowledgeable instructors to be retained for the full period of their usefulness. At present, there is an apathy among higher ratings which the need for a recommend in the middle 30's, if they are to go on, would do much to remove.

For those who intend to make the Navy their career, there must be inducements to re-engage. The post-war Code of Pay improves the financial status of the lower rating at any rate ; but the strongest inducement to continue to serve would be to pay Marriage Allowance only after re-engagement. Assuming the first period is six years, if Marriage Allowance were made payable at 25, on signing on for the further six, or on re-engaging, if he elects to do so earlier, the incentive is provided. If the attainment of a non-substantive rating or similar proficiency were made a qualification before re-engagement the young rating would be given an added stimulus. Three-badge men with little ambition and no qualification have their uses, but there can be too many of them.

FOREIGN SERVICE

If the naval rating is entered young and imbued with the idea that foreign service is something to be expected and enjoyed—as in fact it is, it will cease to be a "bugbear"—a relic of the outlook of the "hostilities only" man. A ship's company on a foreign station is usually far happier, not so much because there are frequent changes of scenery and the glamour of strange peoples, as because of the absence of the disturbing influence of seasonal leave, which tends to unsettle a man. Sampling home life for short periods, he tends to envy his contemporary civilian acquaintances who can get home every night ; but he forgets their vegetable existence ; he spends too much of his time on board scheming "Friday whiles" and "First trains Monday" to be contented. On a Home station, a rating may not know the names of his messmates ; abroad, he is one of a usually very happy company. Listen to two old shipmates talking ; their yarns, often as not, are about adventures during a foreign commission.

The Schools at which a rating may qualify in the higher non-substantive grades of his profession are all in England. That tends to make men who are genuinely keen to specialize reluctant to go abroad because it may postpone their selection for a qualifying Course until the end of the commission. On the other hand there are men who will try to wangle a Course in anything in order to gain extra time in the United Kingdom ; there is no penalty for failure and they can enjoy those months with their attendant week-ends. Were Whale Island or the "Vernon" to be translated to Singapore, one could speculate freely upon the decrease, if any, in the numbers of applicants for higher Gunnery and Torpedo Courses. If the Schools were abroad, not only could the most advanced Courses be taken on the Station, but the Imperial navies could share their facilities.

The Army manages to troop wives and families. The objection to the Navy doing likewise would appear to be the relatively short commission. But on every foreign Station there is a base where a ship spends a proportion of the year ; if a system were introduced whereby Petty Officers and equivalent ratings were permitted to volunteer for a tour of service abroad—a period of years not necessarily in the same ship, it should be possible to troop their wives and families to that base. The choice of a particular Station could not be guaranteed, as naturally some would be

more or less popular than the numbers required there. As a Petty Officer's privilege, this would be a distinct incentive towards advancement. It would allow older men to see and be with their families for a portion of the year. Hitherto, I believe, Malta has been the one Station base where a rating has found it possible to have his wife : the efficiency of the Mediterranean Fleet certainly has not suffered thereby.

Opportunities for the employment of ex-naval ratings occur upon foreign stations. They are often positions of trust and more highly paid than a pensioner can expect in England. Usually a man is unable to accept one of these jobs because his family is at home and loath to move. But, if his family was already with him, and reasonable latitude were permitted to those with promised jobs and within measurable time for pension—assuming their services could be spared—foreign service might be eagerly sought after. Trained Reserves would be available locally. Stagnation in the higher Rates could be corrected.

The post-war Code of Pay aims at broad equality of treatment between the three Services ; but in fact conditions of service can never be the same in the Navy as they are in the Army or Air Force unless it could be guaranteed that every ship would be secured alongside the same jetty each night of the year, which is manifestly absurd. The naval rating cannot "go home to tea" except rarely when he is in depot. Moreover, his life is so different from that of the civilian, that if he is to be contented, he must be trained not only in his professional ability but in the art of living as he has got to live—afloat.

THE REGIMENT

By LIEUT.-COLONEL R. J. A. KAULBACK, D.S.O., *p.s.c.*

NOW that the wars in Europe and the Far East are over and some of the lessons learned in the recent fighting are at last being made available to the general public, it is natural that there should be considerable speculation as to what form our armies should take during the post-war period.

Foremost among the queries that must rise to one's mind in this connection is that of the Infantry. Is it desirable to return to the Cardwell system of dual battalions, one at home and one overseas, both fed from a common depot, or is some other integration and grouping called for? Some aspects of this problem have already been discussed in an earlier article published in the JOURNAL of February, 1944, but as so many of the factors concerning the infantry hinge on what is generally known as the Regimental System, it would be as well to consider this in greater detail and clear our minds exactly as to what we mean by it and what are the essentials which should be retained through any change in order to form a solid basis for the infantry of the future.

Discussion of this subject in the past has tended to be influenced perhaps too much by regimental loyalties and to some extent by rather wishful thinking over what are and what are not the benefits of tradition, and to what lengths these must be allowed to override other more material considerations where reorganization is called for. In this article the writer will try to maintain an entirely objective attitude whose criterion will be whether or not any particular factor adds to, or detracts from, the unit's efficiency in war, because it is for war and not for peace that the Army is designed.

WHAT ARE THE OBJECTS OF THE REGIMENTAL SYSTEM?

It would be well to start from the beginning and consider first what are the foundations and objects of the Regimental System as we know it to-day. There would appear to be three:—

There is the Territorial affiliation which links each regiment with a particular county or area and ensures a close tie between the regiment and the people. Friends and relations serve together, family traditions are frequently built up, and a natural esprit-de-corp is engendered based on the part of the country from which the regiment is recruited.

From this the regiment has developed into a parent body in which the men, and to a great extent the officers too, may expect to pass their entire service. It is well known that men are happier and more cohesive when they know that they are part of a permanent organization in which they can grow up and to which they can give their entire loyalty and affection, whether this is a family, a school, a football team or anything else. It fosters the team spirit, and with that the spirit and pride of the individual members who associate themselves with the whole; but any impermanence is inimical to this object and an individual transferred from one body to another finds it difficult to transfer his allegiance intact with himself.

And lastly there is Tradition—tradition which draws its strength from a regiment's past history and which is enshrined in the uniforms, drills and customs which have been developed and cherished by past generations of fighting men. Any man must be proud of belonging to a unit with a fine tradition, and automatically he takes for himself some of the glory which has gone to make it.

All three of these factors—the Territorial link, Tradition and the Regiment as the parent of the soldier, play a tremendous part in building up the spirit, pride, loyalty and fighting efficiency of the Army, and should on no account be sacrificed ; but we must examine carefully how they are applied and to what extent they have succeeded in attaining their object under modern war conditions.

TO WHAT EXTENT HAVE THESE OBJECTS BEEN ATTAINED DURING THE LATE WAR ?

During the late war, the greatest difficulty which had to be surmounted in trying to maintain the Regimental System was the smallness of the regimental unit in relation to the size of the forces involved in any theatre of operations. The pre-war system of maintaining one battalion of each regiment at home and one overseas caused the scattering of battalions during the War also, because there was no opportunity to concentrate them after the start of hostilities, nor indeed was there any inclination to do so. Though some concentration was effected as more war-time battalions took the field, still it remained very haphazard. It was quite normal for a regiment to be finding single battalions in all theatres of war simultaneously.

This fact alone produced an almost insoluble problem for the supply of reinforcements. On the average, each division in the field required men for battalions of nine different regiments and, as the casualty rate could never be accurately forecast by those responsible for compiling the drafts in England, there was always either a surplus or a deficiency for any particular battalion in the field. The result was that reinforcements received from the R.T.D. always consisted of a mixture of men from whatever drafts had a surplus at that particular moment, and it became impossible to post men with any real regard to their original units. To correct this, some cross-posting between battalions was occasionally done, but in the two battalions commanded by the writer in North Africa, Italy and Germany between 1942 and 1945, there were never less than twenty different regiments represented, and often there were many more. This was a typical average case.

The result of this chaotic state of affairs was that neither officers nor men could guarantee to serve in the field with the regiment to which they had originally been posted, nor indeed could wounded or sick men always expect to return to their own battalions, and the object of the regiment serving as the permanent parent of the soldier broke down from the start.

Furthermore the Territorial link failed equally. Scottish battalions were full of Englishmen and English battalions had men drawn from everywhere ; only some of the Irish battalions remained fairly representative of their country. In part, particularly in the case of Scotland, this was due to there being too many battalions recruited from one small area, but it was aggravated also by the mixing of battalions from different areas within most divisions, so that the division itself was not representative of any particular part of the country. Had it been so, it might have proved possible to pool the resources of that division and ensure that one, for instance from the North, received only North Country reinforcements. This would have gone a long way towards overcoming the trouble.

One aspect of this mixing of units was that the Regimental System started to defeat its own ends. Owing to the closeness of their ties with their own regiments and their conviction that that was the best regiment in the Army, men who were suddenly drafted to another which they had been taught to believe was less good, automatically suffered a loss of morale and, in some notable cases, even refused to

fight and deserted to rejoin a battalion of their own regiment which was somewhere in the same theatre. This was a deplorable state of affairs, and happily did not occur very frequently, but it must be realized that the mixing of regiments in this way was unavoidable and was the direct result of the Regimental System as it stood.

Regimental history, tradition, dress and other peculiarities played a smaller and smaller part in the building of morale and esprit-de-corps as the War proceeded. Except in the case of a very few fortunate ones, such as the Guards and the Rifle Brigade, who succeeded in keeping their own men, the majority of regiments were composed of strangers who had little time for learning the antecedents of the unit they were with and to whom its traditions consequently meant very little. What mattered far more to them was the reputation which that unit had built up for itself in this war, the confidence they felt in their officers and the efficiency of their training and discipline. It would seem, indeed, that these things are of infinitely greater importance to a battalion than any ancient tradition, because morale cannot otherwise stand the strain of battle. Regimental history and tradition alone are of little account except as builders of esprit-de-corps in peace-time, and then the more recent they are the stronger will be their effect.

It is also noteworthy that the reputation of a division as a good fighting division could have a tremendous effect on the men who joined it, and generally speaking division reputations in the latest war have been better recognized than those of the regiments forming part of them.

WHAT ARE THE DRAWBACKS OF THE PRESENT SYSTEM ?

Apart from the obvious breakdown of the system in war, its greatest disadvantage, from which most of the present troubles have sprung, is the inflexibility of personnel even within such a small formation as the infantry brigade. The battalion has developed into an independent and exclusive body whose men cannot be used to make up any deficiencies elsewhere without bad psychological effects on themselves and their hosts ; whereas the situation frequently demands that within the brigade, and if possible within the division too, men should be reasonably at home within any battalion.

This disability is not only confined to the psychological field ; it occurs also in training because, so long as a brigade consists of three separate and quite independent battalions, so long will there be divergencies in their training and methods and a further restriction on their flexibility.

The Germans overcame this by integrating on a higher level and centralizing basic training under the divisional staff. They reaped the benefit in the facility with which they could form *ad hoc* battle-groups from badly mauled units and continue to present a solid front in the way they did in Italy or after the collapse in Normandy in 1944. The British Army is not at present capable of this rapid readjustment.

Tradition, where it turns its eyes resolutely towards the past with too much insistence on the old and too rigid a dislike of the new, can have a strong effect by discouraging progressive thought and change. This is inherent in all military organizations and must be accepted, but efforts should be made to give more weight to those traditions which can be made to serve a modern purpose. How few Regimental Days are celebrated which date from later than the Peninsular War ! But surely the later ones are the more valuable, because they have a modern significance and prevent the mind from swinging too far into the past and fossilizing

behind a facade of colourful dress, drills and ceremonial which play no part in the regiment's real purpose of Twentieth Century war.

From all of this we see that the regiment, as constituted with its separate battalions scattered in different divisions far apart, is too unwieldy and disjointed an organization to function under modern conditions. A change is over-due.

WHAT MUST WE AIM TO ACHIEVE IN THE FUTURE ?

There can be no doubt that the aims of the original Regimental System are sound, but equally it is clear that the system itself is out of date and incapable of competing with recent developments. The system must be re-designed, brought up to date and its basis enlarged, so as once more to proportion itself to the scale of forces employed.

The most urgent necessity is to guarantee that the fighting units receive men from their own locality who have been trained and prepared to come to them and who can then expect to find themselves serving amongst their friends. Furthermore the men must be able to expect, if wounded or sick, to be able to rejoin their own units as soon as they are fit. Morale and esprit-de-corps are vitally dependent on this.

Traditions must also be maintained for building up the psychological background of the units, particularly where these traditions are based on recent exploits. For a unit to have fought at Alamein or Arnhem has more military value now than to have fought at Waterloo, however gallant the exploits of those bygone days may have been. Equally, the peculiarities of the modern foot-infantry or the armoured divisions or airborne divisions will engender far greater pride of regiment than perpetuation of the drills of the Fusiliers, Light Infantry or Rifle regiments whose special functions vanished in the twilight of the Nineteenth Century. Where in the course of reorganization, therefore, the question of amalgamation or disbandment of units comes up for consideration, very careful choice should be made between those whose retention is desirable on purely sentimental or historical grounds and those whose claim is based on the firmer ground of their record in the recent fighting. There are many very young units whose record should guarantee their place against all claimants in spite of their lack of historical background.

Lastly, once these aims have been guaranteed, it is clearly desirable to give the new organization as great a degree of flexibility as possible and, for this purpose, the larger within reason that we can make the unit or formation for which men are recruited the better. The limiting factor is the practical size of the training depot at which men can get to know one another and develop a common esprit-de-corps.

WHAT ORGANIZATION WILL FULFIL THESE AIMS ?

The extent to which the Regimental System failed in the latest war was due to the fact that the units themselves were too small and too scattered to enable an even flow of reinforcements to be maintained. That is the root of the trouble and any reorganization must try to eradicate it.

There would appear to be two methods open. Either the units of the regiment, that is to say the battalions, must be increased in size or, alternatively, they must be grouped together and not scattered. In effect both these methods amount to the same thing, because a battalion cannot be increased in size without expanding into two battalions or three battalions, which is a group of battalions or in other words a brigade.

The suggested solution, then, is for the regiment to consist of three battalions which will serve permanently together as a brigade. That will achieve the aim of producing a sufficiently large body of men to enable reinforcement to be properly carried out. But brigades do not normally operate independently. They are an integral part of a division, and it is therefore for divisions that reinforcements should be planned, because, as the division moves, so must the reinforcements move also. This fits in well with what we said above that the unit or formation for which men are recruited should be as large as possible in order to give the maximum flexibility, and we see that the formation should properly be the division and not the brigade.

A bad way to achieve this would be to form divisions from nine battalions of the same regiment, for the simple reason that it is not unknown for divisions to be annihilated. If that were to happen to a division representing one entire regiment the effect would be catastrophic to the area from which that regiment is recruited, and also to the regiment itself.

The better way would seem to be to form divisions from three regiments each of which finds one brigade, but to link these three regiments and give them a common depot so that personnel are interchangeable. It would necessitate all three regiments having a common uniform—with the exception of badges—a common drill, which is natural as they will all be performing the same function, and to some extent a tradition in common also. But this is by no means so difficult as might appear at first sight. Regiments can be selected which have already formed a tradition of service together in the recent war. The adjustments required will in practice prove to be very slight and, if the division in which they are serving has already its own reputation and traditions, the object can well be attained without in any way prejudicing healthy rivalry any more than is already the case between the various companies within a battalion.

The extent to which this suggested reorganization can be implemented must depend on the number of first and second line divisions which His Majesty's Government decide to maintain in peace-time. If this number is very small, it will mean that there may not be sufficient divisions to allow each regiment to find one complete brigade, and therefore certain regiments may have to be amalgamated into a new composite regiment which would then furnish its quota of three battalions. The provision of second line, or militia, divisions would naturally follow the same pattern, and their brigades would be composed of the 4th, 5th and 6th Battalions of each regiment. Having regiments represented in this way with three battalions in each division will be a safeguard against the annihilation of any regiment in the event of one division suffering severe casualties.

An objection to the linking of regiments within a division will certainly be raised in some quarters on the grounds that the great strength of the regiments up to date has lain in all the aspects of their individuality, and that to sacrifice some of these by merging regiments more in one another will be a dangerous interference with custom and tradition from which the regimental esprit-de-corps must inevitably suffer. But is this valid? We have seen that during the latest war the individuality of regiments was in fact lost because all were composed of mixtures of one another. If this is to be corrected and a measure of real individuality retained, then some sacrifice must be made, and this sacrifice will only really be apparent in peace-time when the rate of replacement is so slow that the older system could possibly be retained in all its rigidity.

Before passing on to consider some of the associated questions that must

necessarily come under review if a change is to be made, it would be well to compare the reorganization suggested here with the objects which we set out to attain and see whether it does in fact fulfil them.

The Territorial link will be maintained because each regiment will still have its recruiting area as before, although this area will now be larger and will be shared by the other two regiments of the division. As an example the 5th Infantry Division, which is already a North Country division, might comprise the Green Howards, The King's Own Yorkshire Light Infantry, and The York and Lancaster Regiment, which would then amalgamate their recruiting areas and share a common depot. In this way regimental and family ties with the districts would not be broken and the transition from old to new could be achieved with little trouble.

The regiment would once again become the permanent home of the soldier and it would be possible to guarantee that, except in very abnormal circumstances, no man would be required to serve outside the regiment of his choice. This would be possible because the joint regimental depot would be required to supply men only to its own division. A division is a large enough formation to have a fairly constant replacement rate, unlike a battalion which either wants a lot quickly or none at all. It is possible therefore to calculate fairly accurately the requirements of a division in action and to maintain that flow continuously from one source. This should make it unnecessary to draw on drafts from outside or to dilute the battalions with foreign elements.

The same would apply to returning sick and wounded because, although their own battalions might have no room for them at that particular time, it is inconceivable that the whole brigade would not, and they could if necessary be held in one of the other battalions of their regiment while waiting to be cross-posted to their proper battalion at a later date. Once again the larger unit would be able to maintain a continuity which would have been impossible for a single battalion.

The question of the introduction of divisional reinforcement battalions to replace the present system of R.T.D.'s is a very large one and, as it does not affect the general problem of the reform of the Regimental System, it is not intended to do more than touch on it here. The suggestion was outlined in an article in this JOURNAL in February, 1944, and if accepted would do a great deal to ensure not only that the men arrive fully trained and refreshed for battle when they come up to join their units in the field, but also to place the distribution of reinforcements to battalions within the division directly under the control of the divisional "A" staff and thus ensure that men returning from hospital or sickness do actually go to their correct battalions. The failure to do this has been a very marked feature of the R.T.D. system in the past.

The third object which we set out to attain was the maintenance of morale and esprit-de-corps by tradition. This so largely depends on the men of the regiment knowing that they will serve with it continuously that it might be said that the problem has already been answered. On the other hand it is worth noting, at this stage, the extent to which divisional "esprit" has superimposed itself on that of individual regiments in the latest war. This has been partly due to the difficulty of singling out particular battalions for praise from among so many, and to the demands of security that prohibit the disclosure of the divisional order of battle, which it would seem is likely to be a feature of any modern war. Divisional traditions have therefore been made and, if maintained, will do a great deal to foster the esprit-de-corps of the regiments from which the division is formed.

THE POSITION OF OFFICERS UNDER THE NEW SYSTEM

The impossibility of retaining officers to serve within their own regiments during the late war has been even more marked than in the case of the other ranks. This has been due to the small numbers involved, the relatively high casualty rate particularly among the junior ranks, and to the necessity for immediate replacement from whatever reinforcements are available once casualties occur. These conditions are unlikely to change appreciably in any future war and officers can, therefore, no longer expect to remain in one regiment, and still less in one battalion, for all their service.

Senior officers will, as in the past, have to expect to be treated as a pool and be selected for command according to their qualifications and without regimental considerations. Junior officers, on the other hand, under the new system could expect to serve for substantial periods of war within one battalion, but they should look upon the entire regiment (brigade) as their home and be prepared to serve at need in any battalion of the division. If this were established as a principle, then it should be possible for officers always to remain within the division of their choice until, of course, they reach the time when they become qualified for command or staff. In any case in peace-time, while casualties are insignificant, there should be no necessity for any more frequent change of battalion than used to occur before 1939.

It is possible that this suggestion of service within any battalion of the division may occasion considerable objection, for the regiment as the "officers' home" has come to be accepted as a *sine qua non*, though less in recent years than formerly. If only, however, it could be realized that this change will in no way destroy the Regimental System but simply expand it, that the home, instead of being the battalion, will become the brigade or division, and that the same loyalties can still be retained, there would probably be less opposition. Particularly must this be so when the urgency of the problem is fully recognized.

A CORPS OF INFANTRY

There has been much discussion as to whether a Corps of Infantry should be instituted in conformity with the practice in the Canadian and most foreign armies. It has been suggested that its creation would provide greater flexibility and esprit-de-corps in the infantry as a whole, though in practice this must always depend on the application of the regulations for posting and interchange of personnel rather than on a simple change of name.

Provided that the divisional system is accepted, there would seem to be no advantage in forming a Corps of Infantry so far as the other ranks are concerned, because they in any case are unlikely to serve outside their own regiment. The officers, however, present a different picture. In all cases they must expect in due course to be transferred either to command or to the staff, or to serve as regimental officers in one of the two other regiments within the division, and therefore to gazette them on first Commission to a Corps of Infantry, rather than to any particular regiment, would seem to have distinct advantages.

OPPOSITION TO CHANGE

There will inevitably be some opposition to whatever changes are proposed. The Army is naturally conservative in its outlook, and no part of it more so than the infantry with its very long history and traditions. Forewarned is forearmed,

and it would be wise therefore to meet in advance some of the arguments on which this opposition might be based.

There are many historical precedents for change. Before the 1914-1918 War, regiments often altered not only their names and their dress, but also their functions. The 31st Foot were at one time Marines, the 87th did not become Fusiliers till 1827, the Rifle Brigade and older Light Infantry regiments were formed from heavy infantry regiments during the Napoleonic wars, and yet no one would suggest that these changes in function or name or dress had an ill effect on the regiments themselves; indeed many of their proudest traditions date from those very changes.

Equally the Cardwell reforms, which were bitterly resented at the time owing to the amalgamation of regiments which they brought about, are not now criticized on the grounds that those regiments lost their identity. In fact the present rigid Regimental System dates almost entirely from after the introduction of Cardwell's measures, and there would seem to be no precedent for retaining the regiments in their present form if expediency dictates otherwise.

On the other hand any needless destruction of the older system should be avoided. Men's minds and habits change slowly, and reform should where possible be slow also in order that it may be more easily assimilated. The new system should grow logically out of the old, and as much as possible of the old be retained and used as the fertilizer from which the new may spring. A reorganization on a divisional instead of a regimental basis will in fact achieve this and, while requiring a wider mental horizon from the regimental soldier, need not in any way destroy the customs on which his older life was based.

It may be asked how this suggested system will fit in with the peace-time employment of the Army. Will it in fact be possible to use the Army, as in the past, for garrison duties throughout the Empire? Divisions are very large formations and many of the old stations, Aden for example, which were formerly garrisoned by a battalion, will not now be able to accommodate an entire division.

The question is valid, but its answer would seem to lie in a better appreciation of the resources of modern transport which the Army now has at its disposal. If full use is made of these, it should no longer be necessary to scatter small infantry garrisons in every area of possible trouble. To do so would once again prevent the Army from training itself for its real role in war. Divisions retained in central positions within, say, twelve hours road or air travel of the centres of trouble, and provided with the necessary transport, can still fulfil their role of assisting the civil power in time of need without meanwhile interfering with their normal work. In every case, so long as an Army is required, the demands of war must override all other considerations where organization is concerned. To think otherwise is to put the cart before the horse.

CONCLUSION

The time has come, therefore, when a new Regimental System should be planned. It should retain the positively useful features and achieve the objects for which the earlier system was designed, but it must be such that it will stand up to the strain of war and not break down as the earlier system did. To achieve this there is no need to scrap the system. That would do damage beyond repair, but the system should be enlarged to suit the enlarged conditions of world conflict.

It has been argued that the development of new weapons of warfare, such as the atom bomb, will render all armies obsolete. That is not our opinion, and anyway there is not the space to discuss that topic in this article. If true, then there is no more to be said; but so long as an army does exist, let us ensure that it is as modern and as well designed to meet the new conditions as our ingenuity can make it. Let us not delay. There can be no better time for completing such a design than at the end of a major war with all our lessons of that war from which to draw, and no better opportunity than now, when the older system is already lying in ruins round our feet.

TRAINING A CITIZEN ARMY

By MAJOR E. A. RUNACRES, ROYAL ENGINEERS

TRADITIONALLY we do not like wearing uniform, and the only tocsin that can normally stir us to put it on is the sound of the enemy's first shot. Yet in two wars we have had to raise a large army—vast in comparison with the total population—and the possibility of having to do so again in the future cannot yet be entirely dismissed. The problems that arise in training a civilian rather than a professional army have therefore a peculiar interest to us; any help that experience and science can give us in speeding and simplifying such a task must not be overlooked.

Man is a political animal: this does not mean, as some sections of the Press seem to think, an animal whose only nourishment is politics. In Britain it is certainly more necessary than in some countries for public explanations to be given of courses of action, especially those which affect the individual's freedom; but unless they take the form of a direct propaganda blast directed on him for civilian political ends, I do not believe that politics have a great deal of effect on the British soldier once at war and in uniform. He does not fight bravely because he believes that the object of the war is to turn the world into a better place, with refrigerators for all and a minimum wage of £5 a week. His courage drives its piles down to rest on much more solid and primitive strata—determination not to draw back from a job, however tough, once he has put his hand to it, and traditional pride as a member of an undefeated nation.

These feelings of his are usually too integral a part of his make-up to be expressed or even conscious. There may be no particular harm done when newspaper correspondents, wishing to achieve a flourish, write about his resemblance to Cromwell's Ironsides, "fighting for what they love and loving what they know," but it is dangerous to proceed from an entirely mistaken interpretation of the part the so-called "agitators" played in that army, to asserting that when training the citizen soldier in war it is essential to explain the reason for everything that is done in its relation to the whole object of the war. Field-Marshal Montgomery's talks to his troops before battle had nothing to do with politics; they were severely technical, keeping strictly to the matter in hand—how the coming battle would be won. It may be added that at the end of his remarks there were no questions.

It is widely believed (rightly) that the political commissar is an important member of every Russian formation, (wrongly) that his chief importance consists in, at intervals, haranguing troops under instruction with such remarks as "Why do we learn to use the bayonet, comrades? To exterminate Fascist vermin." I am far from suggesting that there is no need to bring home to every soldier from time to time the unpleasant object of war—the most rapid killing or reduction to powerlessness of members of the opposing side. But it is required far less than some well-meaning but ignorant admirers of continental systems think and, in any event with British soldiers, the introduction of semi-political matter into training is not the best means of achieving that object.

A more subtle error may proceed from a knowledge of the psychological principles of civilian education, if unbalanced by military experience. It is true that the best type of education in normal life depends on awakening the desire for knowledge; once the spark is kindled it is only a question of feeding the fuel. Unfortunately, in the war-time army we are not dealing with the more brilliant type-

of child or adolescent. In fact, it comes as a definite shock to many officers (especially non-Regulars, perhaps straight from a University), to find when once the volunteer cream has been skimmed off, how low is the mental level of the general population from which the average army conscript is drawn. That level naturally goes on falling, as the vacuum-cleaner of intake searches ever deeper into the pile. When setting out to train such men, sail must be drawn in considerably and the object severely limited. The method which aims at teaching the learner gradually to see for himself why something is done, or done in a certain way, is too much of a long-term project. Training, like every other phase of war, can allow itself no circumlocutions ; it must be brief and to the point.

As war becomes increasingly technological, it is the rapid inculcation of skills that becomes the main object of training. These could all be classed conveniently under the heading of discipline—the unhesitating, instinctive carrying out of an order at a certain level of efficiency, however strained or fatigued the man may be and in whatever danger. Discipline is a conditioned reflex, which every moment of life in the Army works to build up from the time when the new-joined recruit is first called to attention ; such a reflex is easily inhibited, and that is why—as civilians and the Press always fail to grasp—any actions tending to do so, even apparently trivial ones committed in peace-time, are marked down for severe punishment in the Army Act. The grim shadows that stand before the court-martial president's eyes are those of the battlefield.

Discipline in the narrower sense would receive considerable reinforcement from the general method of training suggested here. Based on the realization that most men are not at any time, let alone in the heat and stress of battle, capable of coherent thought, it attempts to build up a much wider system of conditioned reflexes, whether attuned to a word of command or certain other signs presenting themselves to the senses. When training men, for example, in putting right faults arising in some mechanical appliance, there seem to be three grades of ability that one might try to give :—

- (a) power to look at the fault, and work out logically how to deal with it.
- (b) experience, which—although it could not always give a logical account of how it was done—could reach a high measure of success, merely by having seen a large number of examples.
- (c) memory (instinctive and unconscious) of a certain sequence of motions to be gone through whenever certain signs present themselves.

These are arranged in descending order of difficulty and, as can be seen, shade into one another ; in addition, each stage is a sound basis for the next higher. The final level to which one intends to bring any soldier must be largely dependent on the time allotted and his ability. I suggest, however, that it will be safest to make sure that the training method employed can bring everyone at least as far as (c)—the level which I have referred to in an earlier paragraph as a "skill"—before more ambitious projects are taken in hand.

An objection may be made that such training will produce mere automata. It may be answered by saying that the object of all training is to get every soldier to *at least* this level ; at present, by aiming too high or not aiming at all, we get results *below* it. Further, it is only after some reflection that one realizes how big a part the conditioned reflex plays in everyday life. By constant practice, the successive impressions which a ball makes on the retina as it travels towards us will set in

motion, without any conscious thought, a complicated series of co-ordinated actions which bring the bat into connection with it. An even more striking example will be noticed if one tries to become conscious of the extremely delicate and finely balanced motions made when dressing in the morning. Good manners—the easy and instinctive adequacy to any situation of social life—are yet another sphere where the reflex operates.

The "thought" behind action may quite well make no difference at all; for example, a man can cause a car-engine to fire by turning the starting-handle, even though he believes himself to be winding up a spring. Similarly, he can put right a breakdown by going through a series of trained movements in response to certain signs. If his lorry stops, he has a set sequence of action:—

(a) he looks in the petrol tank. If empty, he refills it.

(b) are any of the H.T. leads disconnected? He reconnects them; and so on.

Knowledge of the principles of internal combustion, the Otto cycle or current induction are as little necessary for the production of quite a competent M.T. driver as is that of the theory of ballistics for a gunner. It is stressed again that this is the level which a soldier must attain unless he is to be a menace to himself and his comrades; if time and ability permit, there is nothing to prevent additions to any limit. Before this is attempted, however, the foundations must be absolutely sound. Some of the structures rushed up during the War by jerry-training showed a tendency to collapse inconveniently at moments of sudden stress.

Clearly, training on the lines suggested would mean a considerable change in the instructional method. At the moment the Army still allows itself the luxury of choosing as instructors those who possess nothing more than a degree of information and a convincing exterior; little or nothing is laid down on the methods they are to use, and there is no way of separating the good from the bad except by mere individual opinion or, at a later stage, by the results they have produced. It cannot be safely argued in favour of this method that it is the one used at English public schools. The Army needs, instead of this chaos, a simple drill which every instructor must be able to carry out before he is allowed to undertake the teaching of others. The inculcation of a skill (or, in other words, the formation of a conditioned reflex) can be made a matter for scientific study, and this would be reflected in a rationalization of textbooks and training methods.

Perhaps better than any human instructor would be a machine like the Synchrophone, already used with considerable success in training R.A.F. pilots. It consists of a screen on which a picture of any part of the object being taught can be lighted up at the touch of a button, and a radiogram which plays records of the commentary. The lesson can be repeated identically an indefinite number of times, with speed and pauses completely under control; visual and aural appeal can be accurately balanced. Such a method would, however, only be suitable in a fixed training establishment where the necessary capital outlay was justified.

I do not propose here to go into the technical details of the instructional methods which would be used, and which any competent psychologist could devise. It may be worth mentioning, however, that as our object is to teach the soldier not to think, but to act—to move his body in a certain required manner—the method of training must be based on a logical consideration of that object and of the way in which mental processes work. It would, for example, relegate verbal matter to a comparatively unimportant place, and give much more weight to the visual

and imitative faculties. This is of particular importance with reference to a point already mentioned—the mental level that may be expected in a large percentage of conscripts during a war ; further, we have always with us the problem of training Imperial troops, mostly not English-speaking and non-urbanized. Translators or interpreters will not meet the difficulty, since it is a matter of mental structure. Think of countrymen, even to-day in parts of Britain, trying to describe a route ; watch a company of Gurkhas listening to a lecture on the mechanism of an enemy mine. The ability to work with words and mental images rather than with bodily action is a highly developed one which many men never acquire. To understand this fact is to have grasped the main factor in all training.

A necessary pre-requisite to the use of such instructional methods would be a time and motion study¹, scientifically conducted, of every section of individual training and such parts of group, platoon and larger unit training as proved amenable. The relevant training pamphlet would show the motions to be taught in each lesson ; the pamphlet on instruction (detailing the drill by which such motions were to be taught) would, of course, apply to all. The method of instruction could be taught as easily as parade-ground drill ; there would be no more looking round units to pick out for instructors N.C.O.s with the most impressive "personality."

Speed and mechanization are the two main trends of modern war. If we are to take a realistic view of the problems involved in training a citizen army for such war, we must overhaul completely our present so-called system and get to work on organized, scientific lines. Training has for too long been a recalcitrant child, noticeable for its wayward conduct ; it is high time that it was brought into line.

¹ In view of the great success that time-and-motion study experts have had in reducing fatigue and accidents and speeding up production in factories working for M.A.P. and other bodies, it might well be desirable for all drills used by crews of, for example, guns or searchlights to be designed by such scientists before the equipments were ever put into service.

OUR AFRICAN COLONIAL FORCES

By MAJOR FERGUS HIGGINS, The Oxfordshire and Buckinghamshire Light Infantry

NOW that Great Britain faces so many new defence commitments, while at the same time she must increase her pre-war labour force to gain by exports the so much needed dollars required for food purchases, our African Colonies and their fighting men are destined to play a much greater role in the defence of the Empire than before the War. Furthermore, with the approaching independence or self-government of India, we cannot rely on maintaining such a large and well-trained Indian Army as before. Compared with our pre-war manpower resources, our only accession in numbers is that we can count on drawing on large numbers of Africans, who have proved themselves most resolute fighters in the East African and Burma campaigns.

Although Great Britain's pre-war Colonial policy has been vindicated by the support received during the War from her Colonial dependencies, the key-note of our future policy is not so much the trusteeship of the past policy as the increasing association of the native inhabitants in both government and defence. This was perhaps not sufficiently done in the Far East, where the local forces, although they fought gallantly, were very small in numbers compared with the size and wealth of the population from which they were drawn, as before the War it had been considered that almost the entire responsibility for defence rested on Great Britain aided by small local contingents.

African Colonial troops had justified themselves and proved their value in the 1914-19 War, conquering the German West African Colonies of the Cameroons and Togoland, and playing a major part in the campaign against the redoubtable Von Lettow-Vorbeck in Tanganyika. Very many more Africans have fought in the latest war. Two African divisions—the Eleventh and Twelfth East African, which partially consisted of West African as well as East African troops, aided by South African artillery and air support, played a major part in Sir Alan Cunningham's brilliant campaign that ended in the liberation of Addis Ababa in April, 1941. Similarly, large numbers of Sudanese troops played an important role in Sir William Platt's great campaign which captured Eritrea and liberated the North of Ethiopia.

After the successful conclusion of these campaigns East African troops took a great part in the capture of Madagascar. They also greatly strengthened the garrison of Ceylon, at that time in grave danger of invasion from the Japanese, and ensured the defence of the vital naval base of Mombasa and the East African coast that was so much exposed to Japanese raiders. West African troops for their part expanded enormously in numbers and prepared for a campaign, should it have been necessary, against the Vichy French in Dakar and their West African Colonies. At the same time they prepared and trained for the stern task that awaited them against the hitherto all-conquering Japanese in Burma.

Finally, no less than three African divisions—the 11th East African, 81st and 82nd West Africans, partook in the various Burma campaigns, and covered themselves with honour and glory under the worst of conditions far from their own homes. The 11th East Africans made history by their rapid advance down central Burma, and the first crossing of the Chindwin River. The 81st West African Division in 1944 provided a brigade group which took part in General Wingate's

second airborne operation behind the Japanese lines, while the rest of the Division advanced along the Kaladan Valley and diverted several thousand Japanese soldiers from reinforcing the hard-pressed Kohima-Imphal front. In the succeeding year, the division renewed its advance down the Kaladan Valley, which had had to be stopped in the previous year owing to the Japanese coming so near success at Kohima-Imphal, crossed the Pichaung and Kaladan rivers, and finally in conjunction with the 82nd Division captured Moyhaung. The 82nd West African Division first saw serious action in Burma at the capture of Buthedaung in December, 1944, and later co-operated with the 81st Division in the capture of Moyhaung and other operations in the Kaladan sector. It must not be forgotten, too, that very large numbers of Africans, including Basutos and Cape-coloured, partook in the Middle East campaign in Pioneer and Labour battalions and in motor transport units.

The principal African units, consisting of Africans with European officers and some European non-commissioned officers, are the Royal West African Frontier Force, the King's African Rifles, the Northern Rhodesia Regiment, and Somaliland Camel Corps. The Sudan Defence Force, being raised in the Anglo-Egyptian Sudan, is not regarded strictly as part of the African Colonial forces, although it is trained, equipped and officered broadly on the same lines as the other forces. The Royal West African Frontier Force is composed of men from Nigeria, Gold Coast, Gambia and Sierra Leone, while the soldiers of the King's African Rifles are recruited in Kenya, Uganda, Tanganyika, and Nyassaland.

Before the latest war, the Colonial Governments concerned paid the whole cost of the forces raised in their respective Colonies, including the pay of the British officers and non-commissioned officers seconded to them for tours which varied from thirty months in East Africa to eighteen in West Africa, with only twelve months in Somaliland. Local administration was entirely in the hands of the Colonial Governments, with the political service finding suitable recruits and the Colonial medical service providing medical attention, while the Public Works Department provided and maintained the permanent barracks and quarters. The Governor of the Colony was nominally Commander-in-Chief and almost invariably took a great personal interest in the force.

In London, at the Colonial Office, there was an Inspector-General of African Colonial Forces with a small staff who were responsible to the Colonial Office for choosing suitable officers and non-commissioned officers for secondment, reporting on the efficiency of the various local contingents, formulating the mobilization arrangements in conjunction with the War Office, and issuing the general training policy to the various forces.

The advantages of the pre-war system of seconding British officers and non-commissioned officers were that officers, who would otherwise have been commanding a weak platoon in their British battalion, were able to command a full-strength company with much greater responsibilities, and similarly specially selected English sergeants and corporals found themselves acting as Company Sergeant-Majors or Company Quarter-Master Sergeants. Furthermore, certain officers became very well acquainted with tropical conditions, varying from the thick bush of the Gold Coast to the savanna country of Northern Nigeria and the thorn-covered deserts of the northern frontier district of Kenya. This knowledge became of extreme value when the entry of Italy into the War and the collapse of France necessitated the raising of large African armies under the inspiring leadership of Generals D. P.

Dickinson, Sir Alan Cunningham and Sir William Platt in East Africa, and Sir George Giffard in West Africa.

Among the defects of the pre-war system were that the forces raised in the various Colonies were unbalanced, containing as they did an undue proportion of infantry without sufficient supporting arms and services. The reason of this was that infantry was the cheapest force to maintain. Also it was a relic of the days when tribal rebellions and insurrections were common, leading to the necessity of employing small punitive columns of infantry. When war broke out in East Africa, African brigade groups were formed into divisions and required to have attached to them South African artillery, while there was great difficulty in providing from African resources sufficient Army Service Corps and technical services. By the time African divisions landed in India, the difficulty in the training and provision of sufficient African technical troops had been overcome as a result of almost super-human efforts.

Since September, 1939, the British Imperial Government has been paying for the whole cost of the enormously expanded African Colonial forces, less a contribution from the Colonies of a sum equal to their war defence budgets plus twenty-five per cent. This system may continue in the post-war era ; but with forces much reduced, Colonial contributions will approximate more nearly to the total cost, and Colonial opinion may demand a greater say in the management of their forces than exists at present. Possibly, should great economies on defence expenditure be necessary in England, the Government might be anxious to hand back the administration of African Colonial troops, as, with their knowledge of local conditions, peace-time administration by African Colonial governments is very much cheaper than British Army control.

It is the writer's opinion that in the future the best and most economic results will be achieved if the administration of Colonial forces is handed back to and accepted by the African Colonial governments ; but the War Office should provide grants in order to pay for large-scale concentration for manoeuvres and the provision of the latest weapons with adequate reserves. As a condition of the grant, the War Office should indicate the type and proportion of unit that each Colony should maintain, so that a nucleus at least of the divisional organization is maintained ready for expansion should the British Empire unhappily be involved in another war.

Under the present policy Africans will become increasingly associated in the government of their country, and it is essential that the educated Africans should feel that the force raised in their territory really belongs to them, so that they feel a just pride in its welfare. In order to help foster this spirit, local Commissions must be given to Africans, especially in the technical arms, if qualified candidates can be found. Up country, native Emirs and Chiefs might provide recruits for a battalion or company associated with their Emirate or district rather on the lines of the English county regiments. These battalions or companies, such as a Kano or Sokoto Company in Nigeria, might on occasions be allowed to provide a guard of honour under the local Sergeant-Major to the local Emir.

It is imperative that service with African troops be sought after by the very best type of officer. Experience in the latest war has been that those officers who were happy in Africa, enjoying the increased responsibilities of commanding mainly illiterate Africans and such opportunities as existed of riding, shooting and games, have enjoyed a large measure of immunity from tropical diseases, while those who

were sent there against their will took a dislike to African conditions and had a large amount of sickness. To be popular, service with African troops must provide more pay, more military responsibility and more opportunities of sport than are offered by service with English troops abroad.

It is considered that although there are many advantages in having a permanent cadre of officers as in the Indian Army, the disadvantages outweigh the advantages. The officers' knowledge of the country and language would be increased, but against that officers would tend to become stale and out of date, and the more brilliant officers would refrain from joining a Colonial corps of officers as they would feel that the very highest commands in the British Army would be denied to them. However, it is felt that certain specially selected British non-commissioned officers should, after trial, be allowed to remain permanently with African troops to impart a certain increase of continuity in training.

The training of African troops should be on the lines of British troops, with special emphasis on the necessity of maintaining themselves without motor transport in jungle or forest country. Great efforts must continue to be made to teach the African soldiers English, so that British reinforcements in a future emergency will be able to make themselves understood immediately on arrival. It is equally important that British personnel with the force should speak the native language of their troops, as only by that means can they really get to know them and be respected by them. Special efforts should be made to maintain a reserve of trained Europeans in the Colonies by means of annual training and tactical exercises without troops at week-ends.

An expanded African Army will enable reductions in English garrisons in hot and unhealthy parts of the world, and offset any possible reduction in size of the Indian Army. Finally from my own personal experience in peace and war, I am convinced that the African troops of both East and West Africa will be worthy of their increased responsibilities.

THE ARMY CADET FORCE AND THE REGULAR ARMY

By "SENTRY"

THE Government and the Army Council have both recently endorsed strongly their intention to support the Army Cadet Force. Financial assistance must necessarily be conditioned by the urgent need to safeguard the taxpayer. It is perhaps natural that the discussions of those who have the interests of the cadets at heart often centre round the present obstacles to progress. But in spite of these obstacles, which are gradually being overcome, the Army Cadet Force does in fact receive from the Government a very substantial measure of financial assistance and assistance in kind. A considerable proportion of the financial assistance is in the nature of permissive expenditure, and the extent to which advantage of this is taken depends largely on the personal service which can be given to the A.C.F. both in Military Headquarters and within the A.C.F. itself.

There are certain constitutional changes in the A.C.F. under consideration, but it must be remembered that in the counties and towns, no matter by what names cadet units may be known, within those units there will be the same lads, actuated by the same keenness which is now making so many demands on the services of officers in both the Regular Army and the A.C.F. The same problems over Regular Army assistance that arise now will persist in the future.

It is a common experience to meet in headquarters and units of the Army an officer who expresses himself as anxious to assist and co-operate with the A.C.F., but it is not so common to find officers with the necessary knowledge of local A.C.F. conditions that they can render the best assistance possible in the time they have available. This is no criticism, since there have been many changes in the Army at home, and it is only recently that so strong an impetus has been given by authority, and as a result many officers are being faced with A.C.F. problems which are entirely new to them. What, then, is this machine, for the driving of which the Army is now partly responsible?

The cadets are drawn in part from secondary schools; these find themselves organized into platoons, companies, and sometimes even battalions, known as "closed" units. The remainder are drawn from lads at work, who fill the ranks of "open" units. It is quite common to find a battalion with both closed and open companies. The entirely different holidays and leisure hours of the school and working cadets at once give rise to demands for assistance and leadership at different times.

A second and very important variation lies in the fact that some units are drawn from towns, and some from extremely rural areas. A second batch of problems is superimposed on the first.

Finally, the Regular must remember that the A.C.F. officer is giving voluntary, unpaid and generally spare-time service, and full allowance must always be made for personal idiosyncrasies, opinions, methods and even whims.

At the head of this somewhat mixed team of officers and cadets, each County has its County Commandant, and he is supported by two authoritative bodies. Of these, the first is the County Cadet Committee, often with the Lord Lieutenant as Chairman. This Committee draws for the pre-service element of the cadet's life on the knowledge of the local military commander (or his representative), experienced

retired officers, and sometimes on Cadet battalion commanders. Other aspects of the cadet's life are represented by members from the Local Education Authority, the Churches, other Youth club organizations, and technical Education authorities. So far as military assistance is concerned, the County Commandant turns to the local District or sub-District Headquarters.

It will be seen that the local military commander, or more generally his representative, usually his senior General Staff Officer, is the only individual with a footing in both the Committee and the military headquarters concerned. He is therefore very much of a key man, and if the cadets are to flourish it is essential that he must work in the closest touch with the County Commandant. In passing, it would appear that this fact should be borne in mind in the selection of County Commandants, to ensure that the rank and age element, coupled with the personality element, does not interfere with this very necessary liaison.

The County Cadet Committee should be an expert body with full knowledge of the objects of the A.C.F. and of local conditions; it should be in a position to give the clearest lead on policy and methods. In addition, it has a considerable measure of control over the administration of its County Contingent, and has wide discretionary powers over the expenditure of grants. But it must be remembered that its membership is drawn generally from men with many other interests who meet only occasionally. It would be idle to claim that in every case these Committees develop their full potential. One of the remedies lies in the careful preparation of agenda for meetings, and in clear briefing. In this matter, the Territorial Association secretaries and the local military headquarters should co-operate closely.

The local military headquarters is primarily charged with the responsibility that its cadets receive the fullest measure possible of the pre-service element of their training and the best quality. It controls all military personnel working for the A.C.F., arranges inspections and examinations, and should give the maximum administrative help it can over week-end courses and annual camps. In the past, particularly during the war years, the pressure of high priority military work often led to cadet responsibilities becoming concentrated in the hands of a single officer. With the recent impetus given by the Army Council, this "private army" system is breaking down, and one by one Command, District and Sub-District Headquarters are finding it necessary for each member of its staff, within his own sphere, to handle A.C.F. business. Until this process is complete, the basis of Regular Army assistance to the A.C.F. will probably not be broad enough to fulfil the desires and expectations of the Army Council.

The constitution of the Army Cadet Force has now been traced back from the cadet, through "closed" or "open" sub-units to the County Commandant, and from him to County Cadet Committees, and local Military Headquarters. At this stage, the constitution bifurcates sharply. The Committees, through their Secretaries, deal direct in most administrative matters with their Directorate at the War Office. The Military Headquarters naturally deal through the normal chain of command. It is obvious that such a system, from the standpoint of a purist, is not ideal, and it cannot be denied that difficulties and possibly some inefficiencies do arise. It is, however, probable that these drawbacks are not too high a price to pay for the very great importance attached by men of influence throughout the country to the right of direct official access to the War Office. The answer probably lies in the execution of wide tours, embracing both Military Headquarters, Cadet Committee members, and Army Cadet Force officers, on the part of officers in the War Office

directorate concerned. At the same time, as the movement gathers way, there will be an undoubted tendency for an increase in War Office directives through purely military channels. Unless this is done, there would be a chance of the War Office duplicating or, in extreme cases, undermining local military effort; and there might be a danger of retarding that broadening of the basis of Army assistance to the Army Cadet Force, whereby in course of time every serving officer will come to regard Army Cadet Force matters as part of his normal duty.

An important point, the implications of which are often—perhaps generally—missed by Regular officers, is the fact that in the Army Cadet Force administration is hardly catered for at all. The County Commandant has limited access to the limited administrative potential of the Territorial Army Associations. Below this, the Army Cadet Force is entirely without Government clerks, typewriters, means of inter-communication, pens, paper (except that which descends on them from above) or ink. A scheme exists, inherently sound but limited in application, whereby paid Assistant Administrative and Training Instructors are engaged on a whole-time or part-time basis; but this scheme does not allow even each battalion one such whole-time body. It is not therefore surprising that an order issued by the County Commandant has often little better than an even chance of reaching cadets. Part of the fascination of his Army Cadet Force work to the Regular officer lies in the utterly unexpected results which may emerge out of his profound and well-balanced instructions. The matter is further complicated by the fact that Army Cadet Force officers are voluntary and unpaid workers. If a senior says "Boo" to that sort of subordinate who obviously needs the word, that subordinate will probably at once resign and possibly take two or three friends with him, with the result that forty or fifty cadets are left high and dry.

If, as suggested above, the efforts of all officers on the staffs and services of all military headquarters are to be enlisted on behalf of the A.C.F., there is a very real and imminent danger that there will be a rising tide of correspondence between the Army and the A.C.F. in the Counties. If the numerous pens, shorthand-typists, typewriters, and duplicators in military headquarters are brought into action against the practically non-existent office administration of the Army Cadet Force, the latter will take to its slit trenches and the paper will be used for unauthorized purposes.

There is not yet sufficient experience to draw on to offer a solution to this problem, but the normal remedies for over-abundant paper work are personal contacts, long-term planning, and well-considered meetings. On the A.C.F. side, it will probably be necessary to establish the appointment of an A/Q staff officer to the County Commandant, and fill it with a retired Regular officer with administrative experience and ample leisure.

Before considering possible plans for the education, training and entertainment of the cadet, what of the cadet himself? More particularly, what of the cadet in the open unit, the working lad? Why does he join the A.C.F.? What tends to keep his attendances regular? How can his keenness be maintained and satisfied?

It is safe to say that every working lad who joins the A.C.F. does so because he finds something to admire in the Army. Most lads feel that their membership will add interest to their lives. Many join with a possibly concealed intention of later joining the Army, and a desire to prepare themselves for future service. All of them have to have at least some measure of consent from their parents and their employers, and all have to find time for cadet activities from their spare time and

holidays. Nearly all have at one time or another to contribute a little towards the cost of their communal life. Finally, if they find variety, novelty and adventure even in small degree, they are not slow to show their appreciation.

The onus of meeting these demands must fall very largely on the battalion, company and platoon commanders of the A.C.F. It is on these officers, moreover, that the final stages of administration fall for activities organized elsewhere. For some years these posts have been filled by those who could not serve their country in other capacities, and many of these men feel that their work could now be done better by younger ex-officers, as soon as the latter have settled themselves down in "Civvy Street."

There is therefore a very urgent demand for the right sort of leaders in the A.C.F. and it is no over-statement that the future size and value of the A.C.F. is almost entirely dependent on the extent to which this demand is met. The Colonel of one Line regiment, aware of the very great value to his regiment of his affiliated cadet battalions, is writing to every officer of his regiment as demobilized, and asking that past services to the regiment be carried on in a modified, but extremely valuable form, by enrolment in the A.C.F. His appeal has met with a substantial response.

The considerations so far set out have been assembled in preparation for discussion on the forms that military assistance can take in the lower headquarters. Before dealing with this, a brief word is required on the variable military factors in Districts and Sub-Districts which must condition the assistance they can give. As with the cadets, the geography of the area has a pervading influence. The nature of military work, whether mainly of a preponderating G, A or Q nature, affects the establishment of the headquarters. The types of units and establishments in the area under its control varies the fare it can place before its cadets. These factors, as well as all those already set out, have a considerable bearing on the methods which can be used.

The War Office and Commands provide great numbers of courses during Christmas and Easter holidays. These do certainly cater for a number of cadets, but it has been found that unless each District and Sub-District organizes still further courses, the undoubtedly good influence derived from military environment and training cannot reach far enough out into the sub-units of the A.C.F.

Returning now to the duty laid on all military headquarters and units to assist the Army Cadet Force, the question which arises in the minds of many officers taking up appointments in this country is: "How do I start?" Military assistance is primarily conditioned by the various cadet factors already outlined, and then by the policy for assistance and general methods which have to be worked out by the General Staff. In arriving at this policy, the primary consideration is that it must be agreed with County Commandants concerned. Having obtained this agreement it must be promulgated by the General Staff in a way which throws the least possible strain on the flimsy administrative scaffolding of the Army Cadet Force. Though it is dangerous to assume that steps taken successfully in one area will apply elsewhere, it may be useful to draw on experience to show how a long-term programme of Regular assistance has been set up.

The following is an example of how this problem was tackled. The District concerned is only one of many which is lending itself strongly to the A.C.F.; its own internal military commitments and assets were by no means typical; but on the cadet side, it had every variety of problem. Three Counties were involved, each

with its own personalities and local problems. The cadets were drawn from closed and open units in normal proportions. Both rural and urban areas were affected. Communications varied from good to very bad indeed. Finally, the whole scheme for military assistance was devised by officers with no previous experience of A.C.F. work, and was an attempt to establish long-term machinery whereby the Army and the A.C.F. should work closely together for the benefit of the "cadets."

A draft paper was drawn up by the General Staff, agreed by "A" and "Q" and approved by the G.O.C. It was then circulated to County Commandants and Territorial Army secretaries, and a meeting was convened to evolve the paper in its final form. When it went out, the paper represented the final and considered opinion of all authorities concerned with cadet matters. Attention was drawn to this fact.

The paper then went on to lay down clearly the objects of training, following this with a policy, taking local conditions into account, as to how these objects should be met, and at which points Regular assistance would be concentrated. This led on to methods ; and the first subject dealt with was the full development of the potential within the District for courses, covering "out of camp" training. A programme of about sixty week-end courses between October and July was approved, mainly for cadets in "open" units ; and two courses, each for 250 cadets and each lasting for a week, were arranged during Christmas and Easter holidays. The allocation of vacancies was agreed, and a method of assembling the cadets was evolved and included in the paper, whereby no correspondence of any sort arose over assembling cadets for courses.

The latter point is important, as a big programme of courses will inevitably break down if it leads to bulky correspondence reaching down to Army Cadet Force company and platoon commanders. This can be avoided if the Army insists neither on nominal rolls nor on attendance at a course of the precise number of cadets for which vacancies are allotted. The system pre-supposes long-term planning and the issue of block programmes for courses for, say, three months at a time, the issue being complete at least six weeks before the block programme takes effect.

The paper then dealt with recreational and technical training. It next laid down those subjects to be included in and, possibly more important, excluded from camp training. It gave a clear lead to Army Cadet Force officers over normal evening training and Army Cadet Force organized week-end camps, and explained how the Regular Army courses would help the Army Cadet Force in work which they did entirely on their own.

A scheme of local affiliation or attachments for training was promulgated, whereby all Regular and Cadet units in the same areas were linked together. Commanding Officers were fully briefed by District Headquarters on the part their units could play, and they were ready to discuss local assistance with Army Cadet Force officers as soon as the scheme was published.

Finally, the paper announced that the Army, in co-operation with Territorial Army secretaries, would set up in the first instance one Cadet Centre which would be equipped with everything necessary for either Army or Army Cadet Force organized courses, either evening or week-end, in any subject falling within the syllabuses of the various certificates open to the cadet. The paper gave the necessary authority for free travel, accommodation and rations for the whole programme.

The memorandum was then issued down to every Army Cadet Force officer in the District, and the block programmes made their appearance on notice boards in all

Army Cadet Force accommodation. The scheme was launched; everybody concerned then sat back with some interest to see what happened.

The first course, a technical one, offered 25 vacancies and drew 44 cadets, some from distances of sixty to seventy miles. It ran for twelve week-ends; no cadet dropped out except for absolutely unavoidable reasons, and 34 Certificate T.s were gained. In addition, an observer who knew what to look for could not fail to see progress in many other directions.

The leadership courses for Cadet N.C.O's took a few weeks to stabilize. The first course was a success; the second drew only four cadets for twenty-five vacancies; the next three in some mysterious way drew fifty cadets each. Since then the numbers have steadied down.

In general this aspect of the scheme worked very well, and the courses have established for themselves a reputation for popularity among the cadets. It has now been possible to cut down the scale of Regular N.C.O's staffing these courses and replace them by Army-trained senior Cadet N.C.O's who seem only too pleased to come every week-end. The object is finally to turn the whole scheme back to the Army Cadet Force, the Army limiting itself to supervision, granting the necessary authority for free rations, accommodation and transport, and implementing this authority administratively.

The Centre was opened with ceremony and drew a parade of nearly 3,000 members of the Army Cadet Force. It is now being used most evenings for general or technical training, and last time the writer visited it on a Sunday there were about 200 cadets present, some resident on courses, some in conducted parties from out-lying areas, and some casual visitors to see the wide range of exhibits of military and technical interest.

The affiliation scheme also worked smoothly. A.C.F. officers were to be found in Regular Army messes, and cordial personal relationships grew up on all levels. From these a considerable measure of assistance became available to the Army Cadet Force. This assistance varied widely according to the nature of the military unit concerned. A technical unit was able to stimulate technical training and at the same time provide that military environment which the cadet appreciates. A training unit was able to lend occasional instructors during weekday evenings, and made its gymnasium, miniature ranges and equipment and cinema available to cadets over the week-end. A holding unit organized resident week-end courses on its own. An experimental unit gave at intervals demonstrations of amphibious vehicles, with trips to sea, together with a fully briefed combined operational attack across an estuary. District Headquarters itself took a couple of units under its wing. R.A. and R.E. units now and again ran week-end courses with special lectures and demonstrations having an R.A. and R.E. flavour. A convalescent depot and a military dispersal unit even were drawn into the net. It is probably true that there is hardly a unit in the Army which cannot provide some interest and variety for the cadet.

The cadet indicates by his behaviour and expression his appreciation of Army assistance. Pleasure trips in amphibians were of course very popular; so much so, that as a vehicle came to rest, cadets leapt out in all directions, and they were at the double before their feet touched down, in their anxiety for the next trip. All over the sands were lads at the double, and there was a little anxiety as a cadet-driven Bulldozer, and cadet-driven Jeep joined in the free-for-all. But there was no case of misconduct or failure to obey an order without hesitation.

The Army has always been markedly successful in its command, training and education of the young. A junior N.C.O. who was employed for some time in cadet work was asked how he had liked it. He replied : " It's a smashin' job, sir. The best I could have had to finish off my time."

Provided it is found possible to deploy the Army's resources on behalf of the cadet, within reason and without breaking the A.C.F. administrative side, there is no doubt whatever that the Army will earn a handsome dividend. Experiments have already proved that the knowledge gained in passing Certificate A enables the time taken in training the recruit to be materially shortened. If Certificate T is exploited, and supplemented by Class III Trade Tests, the Army can be assured of an influx of ready-made technical soldiers. But this is the least important advantage. The A.C.F. recruits and trains in the things that matter—the very material the Army needs for its future leadership.

Does the impetus given to the Army Cadet Force involve competition with other Youth organizations ? In certain quarters there are some misgivings, but it is felt that these are unfounded. The A.C.F. is not a Hitler Youth ; its objects are the same as all other healthy Youth movements, but it goes further in catering for the lad who admires the Army and serves him through its pre-service element. Its appeal to this extent is limited, and its numbers will always be controlled by the quantity and quality of its officers and by the availability of accommodation. It is, and always will be, an entirely voluntary organization.

As the scope of Army assistance widens, and as more officers become involved, there will undoubtedly be disappointments and irritations. But the work has its fascination and its rewards, and it has got to go forward. To put it crudely, the cash value of an A.C.F. properly welded to the Army through adequate Army co-operation and assistance is too great to be missed. But to a certain extent, Regular Army assistance has to be " sold " to the A.C.F., both officers and cadets. A few selling points have been indicated, but there are many others. However much this problem is surrounded with difficulties and complications unusual to the Army, there is a fundamental reason for working at it which transcends any reasons so far expressed or inferred and a reason which will be endorsed by all those who have seen the cadet boxing, playing football, or at cadet work. The type of lad who joins the Army Cadet Force is worthy of unsparing effort.

INTERNATIONAL SITUATION

THE PERSIAN PROBLEM

THE following extracts from two articles by Brigadier A. H. Head, M.C., M.P., are published by courtesy of the Editor of the *Daily Telegraph and Morning Post*. The full articles appeared in the issues of that paper of 23rd and 24th April, 1946.

I

The situation in Persia presents two main problems. The major problem is caused by Persia's importance to the Great Powers through her strategic position and vast oil deposits. The lesser problem concerns the improvement of conditions in this backward and ill-governed country. To a large extent both problems depend for solution on the United Nations. I propose first to say something of the general background against which these problems should be viewed. . . .

PERSIA

Persia is very big, some three times bigger than France. Yet she has a population of under 12,000,000. Most of the country is empty—an arid but potentially fertile plateau of great height, yielding crops and attracting small communities only where mountain streams or small underground conduits provide a little water for the fields.

The map shows the shape of Persia to look not unlike a snail crawling uphill from East to West. The head of the snail is Azerbaijan—the green and fertile province which borders on Russia to the North and is the main granary of Persia. The snail's shell is the vast dry plateau, rich in natural resources but awaiting large-scale irrigation and development.

Oil is expected to be found in large quantities in the snail's head and neck (the recent Russian concession in North Persia). In its central tummy are the Anglo-Iranian oilfields, and in its tail the Baluchistan deposits in which America is interested. The major part of North Persia has a common frontier with Russia.

Less than 200,000 of Persia's 12,000,000 are industrial workers. Their future is dubious as the boom in Persian cotton goods, caused by lack of foreign competition during the War, has been followed by a slump accentuated by their inability to export to their chief home market in Azerbaijan since its occupation by Russia.

Agricultural methods have changed little since the days of King Darius. . . . The land belongs to a few rich landlords whose treatment of the peasant varies considerably; but despite a few notable exceptions it is fair to say that the peasant lives in dreadful poverty and squalor, whereas the landlord lives in feudal state on exorbitant revenues.

Public health is appalling. Although unable to obtain really reliable statistics I was astonished to find general agreement that infant mortality was as high as 80 per cent, and the incidence of venereal diseases probably over 50 per cent. The physique and stamina of the population are further impaired by wide-spread opium smoking, for the cultivation of the poppy and the smoking of opium are still legal in Persia.

The gendarmerie and Government officials responsible for law, order and administration are corrupt from top to bottom. . . . This lamentable state of affairs is

the direct result of the gross under-payment of all Persian Government employees, possibly because of their great numbers in this traditionally State-run land. . . .

This blight of corruption has significance because on its elimination depends the practicability of Persia's implementing the reforms so ineffectively proposed by successive governments. Until the administrative machine is adequately paid and purged no reforms can take place. . . . But the preliminary to reform must be an economy in the inordinate number of civil servants.

FOREIGN RELATIONS

Despite political venality, the Persian is a patriot and his allegiance cannot easily be bought or forced by an outside Power. There are some scrupulously honest and upright men in Persian public life. . . .

The only important organized political party is the Tudeh party. In its infancy it appears to have been a perfectly genuine and progressive Persian movement formed with the object of introducing popular reforms; but soon after its inception in 1941 it was taken under the wing of Russia and eventually given both financial and material assistance. It is now undoubtedly under strong Russian protection and influence, and the lines pursued by its Press afford clear indication of direct instructions from Moscow. Generally speaking it is strong only in the northern areas close to the Russian frontier. If in future Russian influence spreads southward, it will increase considerably in strength and might eventually dominate Persian politics.

Foreign interference has been a dominant factor in Persian politics, and the Persians have shown themselves remarkably subtle and supple in playing off one foreign Power against another.

To those who have recently advocated non-interference in Persian affairs by Britain, I would stress this reliance of the Persians on roughly equal pressure by both Powers as a means of preserving some measure of independence. At the moment non-interference would be interpreted as an abandonment of Persia and the prelude to a surrender of British interest in the country.

II

There is a tendency, in some quarters, to accuse anyone who writes or speaks frankly or critically about Russia not only of doing a disservice to the promotion and establishment of world peace, but also of being a bigoted anti-Russian. As a professional soldier who has followed with admiration and interest the remarkable feats of the Red Army, and as an observant traveller who has noted during six weeks in war-time Russia the unselfishness, endurance and pride of the Russian people, I claim to be a Russophile; but I do not for that reason feel bound to acclaim or even remain silent about a foreign policy which has been convulsing a peace-hungry world and is evolved by a small autocracy without reference or explanation to the millions for whom it speaks.

THE RUSSO-PERSIAN AGREEMENT

The recent Russo-Persian Agreement covers the grant of an oil concession, the evacuation of Russian troops from Persia and the future status of the Province of Azerbaijan. . . .

As regards the oil concession I know of no convincing argument against such a grant to Russia. The proximity of the North-West Persian oil deposits to the Russian refineries at Baku and Russia's vast oil requirements caused by the

increasing mechanization of her agricultural system justify her request for a concession. Persian, not Russian troops will guard the oilfields and the boundaries have been drawn to avoid friction as far as possible with any third Power.

It is well to remember, however, that as the Persian Parliament must meet within seven months of March 24th to approve the Agreement and pass the necessary legislation, the Prime Minister, Qavam es-Sultaneh, must at all costs ensure a pro-Russian bias in his Parliament, since the rejection of this undertaking—unpopular in Persia because it was negotiated while Russian troops were on Persian soil, would undoubtedly lead not merely to his own dismissal, but to serious trouble with Russia and the loss of world sympathy.

RUSSIAN POWER POLITICS

Withdrawal of troops is now taking place. . . . It is, however, important to remember that the presence of Russian troops in Persia constitutes a deliberate violation of a treaty and has enabled the Russians firmly to establish their influence in the political and administrative structure of North-Western Persia.

As to the future status of Azerbaijan, the decision that this shall be treated as a domestic Persian problem appears at first sight logical and satisfactory; but herein lies the crux of the future of Persia, and it is necessary to consider what has been happening and is likely to happen in this most important province, which is the main granary of Persia.

Although we were not allowed passes to Azerbaijan, many people were coming out of the province, and reports from all quarters formed a definite pattern and closely resembled reports of Russian activities in certain areas of the Balkans. Behind the "iron curtain" which has recently separated Azerbaijan from the rest of Persia the Democratic party, a renamed version of the Tudeh party, has been established in power thanks to the presence of Russian troops.

In addition a large number of agents have been brought across the border from Russian Azerbaijan to assist in promoting strong Russian influence in the province. This technique is facilitated by the similarity in appearance and language between the Persian and Russian Azerbaijani, and these indistinguishable political agitators will undoubtedly be left behind when the Russian troops withdraw.

Every method is used to force allegiance to the Democratic party, including the unscrupulous and inexcusable use of food politics. All this is well known to every well-informed Persian; but in England these facts and their significance appear to be little understood.

It may well be asked why Russia is taking such strong measures to ensure that her influence shall dominate this province, after the withdrawal of her troops. The answer lies partly in its economic importance, for the rest of Persia is to a considerable extent dependent on food exported from Azerbaijan. A pro-Russian puppet government installed with some degree of local autonomy would immensely increase Russian influence on the Teheran Government. Furthermore, such a government should not find it difficult at a chosen time to opt for inclusion as a Soviet Republic; and in that event Russia would have emasculated Persia and placed her almost completely under her influence. . . .

In fact, Azerbaijan is a most important square on the world's chessboard and, if dominated by Russia, might prove a useful starting point for inserting the thin

edge of a wedge to dislodge Britain from her strategic necessities in the Middle East and thus bring about a situation critical for world peace. It is well to bear in mind that Azerbaijan borders on a possible Russian-inspired Kurdish republic which, if created, would include parts of Irak and Turkey.

At the moment considerable Russian pressure is undoubtedly being used on the Persian Government. This . . . is . . . reflected in the recent imprisonment of Sayyid Zia and the C.G.S. of the Persian Army, General Arfa. Many Cabinet Ministers (they include the Chief of Police and the head of the Gendarmerie) whose anti-Russian feelings are known but less open have recently been removed from their posts and replaced by well-known Russophiles. Anti-Russian newspapers are suppressed and the country has been filled with a spate of anti-British propaganda.

Russia's natural anxiety regarding security must, however, be respected. Nevertheless, such requirements do not justify the ruthless methods used in Azerbaijan nor the flood of anti-British propaganda, and it would appear that Russia is following the same technique as she has recently employed of supplying maximum pressure which, in previous cases, has invariably been followed by the collapse of resistance and the achievement of her object.

The Russian Government are realists, and as the barriers tumble down their confidence in their strength must increase and their amusement at the outwardly friendly overtures made to them by potential victims probably increases also. If we are to gain their respect and check their opportunism it will come only through firm action ; and the power of making a firm stand lies only with the United Nations.

END OF THE LEAGUE OF NATIONS

The League of Nations and the Permanent Court for International Justice passed out of existence on the 19th April, 1946, in accordance with the provisions contained in two resolutions adopted by the twenty-first League Assembly.

CORRESPONDENCE

THE LEYTE BATTLE

To the Editor of the R.U.S.I. Journal.

SIR.—Presumably in due course a detailed official account of the Leyte Battle will be forthcoming. In the meanwhile the lecture by Captain McManes, U.S.N., in the November issue of this JOURNAL forms the most valuable contribution to the subject so far available.

Owing to my long and close association with Far Eastern affairs—I had previously been an Adviser to the Peking Government and, as one detail, was Executive officer of the Chinese Flagship at the Yalu battle in 1894—I followed events in the Pacific with special interest.

I looked on the Atlantic Charter as, in effect, a declaration of war against Japan, and, having in view their virile decisiveness in their two previous wars, waited with interest for their reaction to it, which I anticipated would be a dramatic one. It came somewhat later in the attack on Pearl Harbour.

Then arose the question of what the policies of the two fleets would be. The Americans had sustained a serious material disaster, and what was no less bad had had a blow to their *amour propre* which must have been hard to bear. On the top of this must have been the realization that never in their history—apart from the minor Cuban affair—had they fought a fleet action, and that their enemy had the tradition behind them of two notable naval victories.

As to the Japanese fleet; its obvious policy was to seek out its enemy, whether in whole or in part, wherever it could be found, and to fight it in force. Fortunately for the Americans that policy was not adopted. Instead the Japanese kept their battle fleet in reserve and frittered away their great navy in a series of minor operations in which they lost a large number of aircraft carriers. One result of that policy was to provide the American Admirals with valuable opportunities to gain experience in battle practice, and such excellent use did they make of those opportunities that they ended the War with a reputation for daring and skill in battle second to none.

This failure of the Japanese to make use of their battle fleet until the battle of Leyte has greatly puzzled interested observers, and Captain McManes, the lecturer, finds no explanation of it. For what it may be worth, I now offer mine.

The inducement held out to the Japanese to join the German-Italian Axis was freedom of Empire expansion in the Far East. In agreeing to it the Japanese High Command had complete confidence in their ability to possess themselves of Malaya, Singapore and the East Indies. Would, however, a victorious Germany acquiesce—the pact notwithstanding—in Japan becoming possessed of the immense wealth of those territories? The High Command doubted it, and to safeguard their right against German treachery decided, at the cost of sacrificing the use it would have been in the Pacific war, to keep their battle fleet intact at Singapore to meet that danger.

W. F. TYLER,

Lieutenant-Commander, R.N.R.

Jamaica.

February, 1946.

ARMY WELFARE

To the Editor of the R.U.S.I. Journal.

SIR.—The writer of "Six Years of Army Welfare" has given a fair account of the activities in which Local Army Welfare Officers have been engaged during the past few years, even if the amount of work which has fallen to him has been, perhaps, above the average. But in suggesting that so long as certain units continue to exist, and so long as there are "erring wives," there seems to be little chance of respite for the L.A.W.O. in the future, he is giving support to a most dangerous idea.

At the conclusion of the 1914-18 war it was the general experience of Commanding Officers that those of their officers who had joined the Army since its outbreak had become so habituated to the interests and amusements of their men being attended to by outside organizations as to have little idea of their own responsibilities in these matters under peace conditions. Furthermore, it was most noticeable at that period that those units which most quickly regained their pre-war standard of all-round efficiency were those in which the tradition had most quickly been re-established that every regimental officer is from the position he holds a *welfare officer*.

It has been apparent to me recently that Commanding Officers are directing every effort to eradicate the dangerous idea that welfare is a "specialist duty" to be carried out for units from outside, and the extent to which they have succeeded in rendering their units self-supporting in this respect is most marked. Failure to realize this may transform a L.A.W.O. from a busy person rendering useful service to a busybody intruding on the preserves of a Commanding Officer.

As to difficulties in the soldier's home, these are first and foremost the concern of the S.S. & A.F.A. It was only with the immense increase of the Army that L.A.W.O.s were called on to come to the assistance of that admirable organization. When the Army is reduced to its peace establishment the S.S. & A.F.A. will be as capable of dealing with these matters as before the War.

In conclusion, as a L.A.W.O., I feel that I must express my regret that the writer of the article should have felt it necessary to discredit the work of those in the higher ranks of the welfare hierarchy in order to emphasise the importance of that performed by others like him and myself. Any suggestion that the District Welfare Officer, under whom I have been privileged to work during the past five years, merely views the subject of welfare from the office chair would be nothing short of monstrous. Despite an immense amount of office work, he has throughout kept in close and personal touch with all his L.A.W.O.s, with voluntary workers at canteens, etc., and with every unit which has passed through the District.

"ANOTHER LOCAL,"
Brigadier (ret.).

9th April, 1946.

To the Editor of the R.U.S.I. Journal.

SIR,—Having been personally associated with Army Welfare from the beginning, in fact from before the War, I know what a true picture of the work of an Army Welfare Officer the article in the February JOURNAL gives. It is quite first class and all of us connected with Welfare are very glad that this story of the work of Army Welfare Officers has been placed on record.

N. UNDERHILL,
Major,
Secretary, Survey T.A. & A.F. Association.

TANKS IN MALTA, 1940

To the Editor of the R.U.S.I. Journal.

SIR,—On page 41 of the February JOURNAL it is stated that thirty tanks in all were sent to Malta. The actual number received was four heavy and two light tanks. They arrived by a convoy on the 10th November, 1940.

It is obvious that this has practically no bearing on the object with which Brigadier Carver's very interesting paper was written—but there is another point of view.

S. J. P. SCOBELL,
Major-General.

12th March, 1946.

GENERAL SERVICE NOTES

MR. CHURCHILL'S ADDRESS TO U.S. ARMY AND NAVY OFFICERS¹

At the invitation of the Secretary of War and of General of the Army, Dwight D. Eisenhower, Mr. Winston Churchill while in Washington met informally on 9th March, 1946, several Army and Navy officers with whom he was associated in the Mediterranean and European campaigns and also a number of Army and Navy officers and War and Navy Department officials whom he had not met previously.

Mr. Churchill was introduced by General Eisenhower, and in his address to the meeting said :—

" It is indeed a very great pleasure and honour to me that the Secretary of War and General Eisenhower should have asked me here to-day and have given me an opportunity, before going home, to meet the high officers of the United States Services and to express to them on behalf of my own country and of the British Services our admiration and gratitude for all they have done in this great common struggle carried to absolute victory in arms.

" The prevailing feature of our work together was the intimacy of association. Language is a great bridge. There are many, many ideas we have in common and also practice; but there was a spirit of loyalty, of good will, of comradeship which never has been seen in all the history of war between Allied Armies, Navies, Air Forces fighting together side by side.

" On General Eisenhower's staff, which I saw often and closely in Africa, in France and in Germany, it was carried to extreme perfection. . . . I am certain that our effective unity saved scores of thousands of lives, perhaps far more, and abridged the course of the struggle, as nothing else could have done. . . . No one was more the champion and embodiment of this unity than General Eisenhower. I never had a chance to visit the Pacific but I am told the same conditions prevailed there as were established by him at SHAEF Headquarters and in the field. . . .

" I have been thinking a great deal about the work of the United States' Services. I will speak a little more of the Army than of the others because I saw more of it. I greatly admired the manner in which the American Army was formed. I think it was a prodigy of organization, of improvisation. There have been many occasions when a powerful state has wished to raise great armies, and with money and time, and discipline and loyalty that can be accomplished. Nevertheless the rate at which the small American Army of only a few hundred thousand men not long before the War created the mighty force of millions of soldiers, is a wonder in military history. . . . In great and rapid rotation they were formed, and moved on to further stages of their perfection. I saw the creation of this mighty force—this mighty Army, victorious in every theatre against the enemy in so short a time and from such a very small parent stock. This is an achievement which the soldiers of every other country will always study with admiration and with envy.

" But that is not the whole story, nor even the greatest part of the story. To create great Armies is one thing; to lead them and to handle them is another. It remains to me a mystery as yet unexplained how the very small staffs which the United States kept

¹ The Institution is indebted to Field Marshal Lord Maitland Wilson, G.C.B., D.S.O., A.D.C., for a copy of Mr. Churchill's address.

during the years of peace were able not only to build up the Armies and Air Force units, but also to find the leaders and vast staffs capable of handling enormous masses and of moving them faster and farther than masses have ever been moved in war before. The United States owes a debt to its officer corps. . . . Undoubtedly the military profession in the great Western democracies, which whole-heartedly desire peace, is one which has required great sacrifices from those who devote themselves to it. All around them goes the busy exciting world of business and politics with all its varieties, but the officers frugally, modestly, industriously, faithfully pursue their professional studies and duties, very often for long periods at a time, without the public notice. That you should have been able to preserve the art not only of creating mighty armies almost at the stroke of a wand, but of leading and guiding those armies upon a scale incomparably greater than anything that was prepared for or even dreamed of, constitutes a gift made by the Officer Corps of the United States to their nation in time of trouble which I earnestly hope will never be forgotten here, and it certainly never will be forgotten in the Island from which I come, . . .

"We talk a great deal about the future of armies and we are studying this matter across the ocean ourselves, and the relation between the officers and the other ranks. I speak not entirely as an amateur. I went through five years of professional training at the beginning of my life, in those impressionable years, and have had the good fortune to be in all the wars that Great Britain has been engaged in in one capacity or another during my lifetime. We now have to choose very carefully the line of division between the officers and other ranks upon which authority should stand. There is only one line in my view, and that is professional attainment. The men have a right to feel that their officers know far better than they do how to bring them safely and victoriously through terrible difficult decisions which arise in war. And for my part as far as Great Britain is concerned, I shall always urge that the tendency in the future should be to prolong the courses of instruction at the colleges rather than to abridge them, and to equip our young officers with that special technical professional knowledge which soldiers have a right to expect from those who can give them orders if necessary to go to their deaths. It is quite clear that class or wealth or favour will not be allowed in the modern world to afford dividing lines. Professional attainment, based upon prolonged study, and collective study at colleges, rank by rank, and age by age—those are the title needs of the commanders of the future armies, and the secret of future victories. . . ."

GREAT BRITAIN

ROYAL OBSERVATORY'S NEW QUARTERS

On 12th April, it was announced by the Admiralty that Hurstmonceux Castle, Sussex, had been chosen as the future home of the Royal Observatory, Greenwich.

Because of the growth of London, astronomical observations from Greenwich have been restricted by the impurity of the atmosphere and the lightness of the sky at night, and the removal of the Observatory from the London area has become necessary. Hurstmonceux Castle was selected after consultation with the Board of Visitors as the most suitable of a number of possibilities. Removal will not involve any change in the position of the prime meridian of Longitude which was fixed by international agreement.

OFFICERS' PAY

A White Paper (Cmd. 6750, H.M. Stationery Office, 6d.) was issued on 6th March setting forth the new rates of pay, allowances, retired pay and service gratuities for Commissioned officers of the Armed Forces—to come into effect on 1st July, 1946. Summaries of the new regulations were published in the Press on 7th March.

UNITED STATES**PROMOTION AND FULL PAY FOR LIFE FOR SERVICE COMMANDERS**

President Truman announced on 28th March, 1946, that Generals Marshall, MacArthur, Eisenhower, and Arnold had been made permanent five-star Generals, and Admirals Leahy, King, Nimitz, and Halsey permanent five-star Admirals. Permanent four-star rank had been conferred on General Vandegrift, of the Marine Corps, and Admiral Waesche, of the Coastguards.

These appointments, he added, would create a group of elder statesmen for consultation on national defence. The officers concerned would receive full war-time pay and emoluments for life, and thus would never be under the necessity of taking posts in business or industry. For once, the President said, the Republic was being fair to the men who took the nation through a great world crisis.

SOVIET UNION**WAR SUPPLIES FROM BRITAIN**

The Prime Minister stated in the House of Commons on 16th April that between 1st October, 1941, and 31st March, 1946, we supplied to the U.S.S.R. 5,218 Tanks, of which 1,388 were from Canada. We supplied 7,411 aircraft, including 3,129 aircraft sent from the United States of America. The total value of military supplies despatched amounted to approximately £308,000,000. We had also sent about £120,000,000 of raw materials, foodstuffs, machinery, industrial plant, medical supplies, and hospital equipment.

There were 41 outward convoys which went to Russia during the War.

SUPREME COMMANDER-IN-CHIEF

It was announced from Moscow on 25th February that the People's Commissariat for the Navy was abolished and that the People's Commissariat for Defence was "transformed" into a new People's Commissariat of the Armed Forces of the U.S.S.R., with Marshal Stalin as Supreme Commander-in-Chief.

The main significance of the change is that Marshal Stalin now takes over the command of the Red Navy, which was formerly an independent service.

WELLINGTON COLLEGE WAR MEMORIAL FUND

An Appeal is being launched by the Governors and representative Old Wellingtonians for funds to commemorate the 460 Old Wellingtonians who have given their lives in the Second World War. Donations received will be paid into the Wellington College (1941) War Exhibitions Fund to assist in the education at Wellington College of the sons of Army, Navy and Air Force Officers, with preference to Old Wellingtonians and of any Old Wellingtonians killed or incapacitated by enemy action; and a small portion of the Fund will be devoted to a visible Memorial.

The organizers suggest that the purpose for which the Fund is to be raised may appeal to others than those who have intimate associations with the College. The percentage of Wellington boys passing into H.M. Forces during the last eighty years presents an unusual record, and it is estimated that since the College was opened in 1859 one Wellingtonian in every ten has been killed in action.

A Final Appeal will be made at the O.W. Victory Dinner to be held at the Connaught Rooms on Waterloo Day, June 18th, 1946.

Cheques should be made payable to the Wellington College War Memorial Fund, crossed Barclays Bank, and sent to Barclays Bank, Goslings Branch, 19, Fleet Street, E.C.4, or to the Chairman of the Fund, E. Gould, Esq., at Wellington College, Berks, from whom any further information may be obtained.

NAVY NOTES

GREAT BRITAIN

H.M. THE KING

It was announced from Buckingham Palace on 14th March that the King and Queen have graciously consented to accept the suggestion of the Prime Minister of the Union of South Africa that they should visit South Africa in the early part of next year. Their Majesties, who would be accompanied by the Princess Elizabeth and the Princess Margaret, hope to reach Cape Town some time in February, 1947. It was also announced, on 26th March, that the Royal party will travel in H.M.S. "Vanguard," the new battleship launched by Princess Elizabeth at Clydebank in December, 1944. The first Commanding Officer of the ship is Captain W. G. Agnew, C.B., C.V.O., D.S.O., R.N.

Captain A. H. Maxwell-Hyslop, A.M., has been appointed a Naval Aide-de-Camp to the King from 21st November, 1945.

The following officers have been appointed as Naval Aides-de-Camp to the King from 2nd January, 1946:—Captain P. Ruck-Keene, C.B.E., D.S.O., Captain Sir Philip Bowyer-Smith, Bt., Captain J. G. Y. Loveband, Captain Q. D. Graham, C.B.E., D.S.O. and Bar, Commodore H. B. Crane, Captain N. V. Grace, and Captain P. W. B. Brooking, D.S.O. and Bar.

The following officers have been appointed Naval Aides-de-Camp to the King from 14th March, 1946:—Engineer Captain L. C. S. Noake, Captain (E) L. H. Heath.

The following officers have been appointed Royal Marine Aides-de-Camp to the King from the dates named:—Colonel-Commandant (acting Major-General) H. T. Newman, C.B.E., in place of Colonel-Commandant (temporary Brigadier) T. H. Jameson, C.B.E., D.S.O., promoted Major-General (1st January, 1946); Colonel-Commandant (temporary Brigadier) R. A. D. Brooks, C.B., C.M.G., D.S.O., in place of Colonel-Commandant (temporary Brigadier) A. H. E. Reading, promoted Major-General (3rd January, 1946).

It was announced on 1st March that the King had appointed Captain E. M. C. A. Smith, R.N., to be an Extra Equerry to His Majesty. On 25th January, it was announced that the King had appointed Lieutenant P. W. B. Ashmore, D.S.C., R.N., to be an Equerry (temporary) to His Majesty, to date from 24th January.

BOARD OF ADMIRALTY.

The Prime Minister announced in the House of Commons on 19th February a decision by the Government, with the King's approval, to send to India towards the end of March a special mission of three Cabinet Ministers, one being Mr. A. V. Alexander, First Lord of the Admiralty. During the absence of the First Lord, the Prime Minister would assume responsibility for Admiralty business.

The King has been pleased, by Letters Patent under the Great Seal, bearing date 27th February, 1946, to appoint the following to be Commissioners for Executing the Office of Lord High Admiral of the United Kingdom:—

The Right Hon. Albert V. Alexander, C.H.

Admiral of the Fleet Andrew Browne, Viscount Cunningham of Hyndhope, K.T., G.C.B., D.S.O.

Admiral Sir Charles E. Kennedy-Purvis, G.B.E., K.C.B.

Rear-Admiral C. S. Daniel, C.B., C.B.E., D.S.O.

Vice-Admiral Sir Douglas B. Fisher, K.B.E., C.B.

Rear-Admiral Sir Thomas H. Troubridge, K.C.B., D.S.O.

Vice-Admiral Sir Rhoderick R. McGrigor, K.C.B., D.S.O.

John Dugdale, Esq.

Walter James Edwards, Esq.

Sir Henry Vaughan Markham, K.C.B., M.C.

FIRST SEA LORD.—The King has approved the appointment of Admiral Sir John H. D. Cunningham, G.C.B., M.V.O., as First Sea Lord and Chief of Naval Staff, in succession to Admiral of the Fleet Lord Cunningham of Hyndhope, to take effect on 10th June, 1946.

FLAG APPOINTMENTS

The following appointments were announced on 20th February:—

Admiral Sir Harold M. Burrough to be Commander-in-Chief, The Nore, in succession to Admiral of the Fleet Lord Tovey, to date about 24th April.

Admiral Sir Algernon U. Willis to be Commander-in-Chief, Mediterranean Fleet, in succession to Admiral Sir John H. D. Cunningham, to take effect about the end of April.

Vice-Admiral Sir Harold T. C. Walker to be Vice-Admiral Commanding British Naval Forces in Germany and Chief British Naval Representative on the Allied Control Commission, in succession to Admiral Sir Harold M. Burrough, to date about 15th March.

The following appointments were announced on 12th February:—

Rear-Admiral A. C. G. Madden to be Deputy Controller and Director of Naval Equipment, in succession to Vice-Admiral Sir Charles E. B. Simeon (retired), to take effect in March, 1946.

Rear-Admiral R. V. Symonds-Tayler to be Chief of Staff to Admiral Sir Henry Moore, who is the Naval Representative of the British Chiefs of Staff on the Military Staff Committee of the Security Council, United Nations Organization, to date 16th March, 1946.

Commodore 1st Class M. J. Mansergh to be Naval Secretary to the First Lord of the Admiralty, in succession to Rear-Admiral C. B. Barry, to date 8th April, 1946, serving in the acting rank of Rear-Admiral.

The following appointments were announced on 9th March:—

Vice-Admiral Sir Frederick H. G. Dalrymple-Hamilton to be Flag Officer, Rosyth, in succession to Admiral Sir William J. Whitworth, to date about 15th July, 1946.

Rear-Admiral M. H. A. Kelsey to be Rear-Admiral-in-Charge, Malta, and Admiral Superintendent, H. M. Dockyard, Malta, in succession to Vice-Admiral Sir Frederick H. G. Dalrymple-Hamilton, to date about 1st May, 1946.

Rear-Admiral H. J. Egerton to be Flag Officer, Malaya, in succession to Rear-Admiral Sir John A. V. Morse, to take effect in April, 1946.

Rear-Admiral G. B. Middleton to be Admiral Superintendent, H.M. Dockyard, Chatham, in succession to Admiral J. G. Crace, retired, to date about 15th July, 1946.

It was announced on 11th March that the appointment had been approved of Rear-Admiral A. G. Talbot as Senior British Naval Officer, Greece, and Head of the Naval Mission to Greece, in succession to Vice-Admiral R. R. Turner (retired) from about the middle of April.

It was announced on 19th March that Rear-Admiral C. H. L. Woodhouse had been appointed Rear-Admiral (Aircraft Carriers), British Pacific Fleet, in succession to Vice-Admiral Sir Philip Vian, to take effect early in May.

It was announced on 28th March that Rear-Admiral G. N. Oliver had been appointed Admiral (Air), in succession to Vice-Admiral Sir Denis W. Boyd.

It was announced on 24th January that the King had appointed Admiral Sir Ralph Leatham, retired, lately Commander-in-Chief, Plymouth, to be Governor and Commander-

in-Chief of Bermuda, in succession to Lord Burghley, whose resignation was recently accepted by His Majesty.

ADMIRALTY APPOINTMENTS

Captain Guy Willoughby has been appointed Director of Naval Air Warfare, and Captain K. S. Colquhoun Director of Naval Air Organization and Training.

PROMOTIONS

Consequent on the retirement of Admiral Sir Ralph Leatham, at his own request to facilitate the promotion of younger officers, the following promotions were approved:—

Vice-Admiral Sir E. Neville Syfret, K.C.B., K.B.E., to be Admiral in H.M. Fleet, to date 1st February, 1946.

Rear-Admiral Sir Cecil H. J. Harcourt, K.C.B., C.B.E., to be Vice-Admiral in H.M. Fleet, to date 1st February, 1946.

On 15th March, Vice-Admiral Sir Geoffrey J. A. Miles, K.C.B., became supernumerary on being lent to the Government of India as Flag Officer Commanding, Royal Indian Navy. In consequence:—

Rear-Admiral W. R. Patterson, C.B., C.V.O., was promoted to Vice-Admiral in H.M. Fleet, to date 15th March, 1946, and reappointed on promotion as Vice-Admiral Commanding, 5th Cruiser Squadron.

On 1st March, the following promotions of Captains (E) to Rear-Admiral (E) were notified:—

G. H. H. Brown, C. P. Berthon (2nd October, 1945).

On 22nd February, the promotion was notified of Surgeon Captain C. E. Greeson to Surgeon Rear-Admiral (9th July, 1945).

On 5th April, the promotion was notified of Surgeon Captain J. A. Maxwell, C.B., C.V.O., O.B.E., to Surgeon Rear-Admiral (1st January, 1946).

RETIREMENT

The Admiralty has approved the retirement of Admiral Sir Guy C. C. Royle, to date from 16th March. Admiral Royle asked to be placed on the Retired List to facilitate the promotion of younger officers. While on loan to the Royal Australian Navy he was supernumerary to the establishment, and so no immediate vacancies for promotion were created by his retirement.

HONOURS AND AWARDS

The following were notified on 22nd January:—

C.B.—Captain O. L. Gordon, M.V.O., R.N., for gallant service whilst in command of H.M.S. "Exeter" in her last actions against greatly superior Japanese forces on 27th February and 1st March, 1942.

C.B.E.—Acting Captain C. A. G. Hutchinson, D.S.O., R.N., (retired) for courage and leadership resulting in the rescue of men from the burning mess deck of H.M.S. "Glenearn" after a serious petrol fire had broken out on 31st August, 1945.

Lieutenant-Commander W. G. C. Elder, R.N., for outstanding services rendered whilst a prisoner of war.

Temporary Acting Lieutenant-Commander Harold Johnson, R.N.R., for gallantry and devotion to duty in saving life when H.M.S. "Britomart" was lost on 27th August, 1944.

The following was notified on 19th February:—

C.B.E.—Captain (Commodore, 2nd Class) A. C. Collinson, R.N., for coolness, courage and determination during the assault on Hong Kong, and for the fine example set by him as a prisoner of war in Japanese hands.

THE NAVY ESTIMATES

The Navy Estimates for 1946-47 were published as a White Paper (No. 81, price 1d.) on 28th February. They provided for a total of £255,075,000, of which £238,007,000 was for Effective Services, £11,704,000 for Non-Effective Services, and £5,364,000 for Merchant Shipbuilding. The number of officers, seamen, boys and Royal Marines was 490,000, and of Royal Marine Police, 2,800.

Introducing the Estimates in Committee of Supply of the House of Commons on 7th March, the First Lord, Mr. A. V. Alexander, said that the total could not be compared with either that for the Navy before the War or with what it was likely to be in future years. He mentioned the general increase in prices and wage levels, the increased pay of officers and men, large commitments in respect of wartime production (despite heavy cancellations), liabilities for personnel leaving the Service in respect of leave allowances, war gratuities and postwar credits, and exceptional charges for rehabilitation of requisitioned premises.

The First Lord gave a brief account of the part played by the Royal Navy in the 1939-45 war. Casualties included nearly 51,000 officers and men killed or missing, excluding the Navies of the Dominions and excluding the Royal Marines. This number exceeded by over 20,000 the numbers killed in the Royal Navy during the war of 1914-18.

Losses of H.M. ships and craft, including requisitioned ships in naval service, from the beginning of the war to 31st August, 1945, amounted to no less than 3,282. They included three battleships and two battle-cruisers, or one-third of our capital ship strength at the outbreak of war; five fleet carriers; 23 cruisers; 134 destroyers; and 77 submarines.

The naval construction programme for 1945 was reduced to the absolute minimum at the end of the War, and now consisted of only two escort vessels, one submarine, two surveying ships, six small floating docks, and some miscellaneous small craft. Only one battleship was under construction—the "Vanguard", then practically finished. She would be of 42,500 tons, estimated standard displacement, with a main armament of eight 15-in. guns. Her estimated cost was approximately £9,000,000, excluding the cost of the mountings and guns for the main armament which were already available. Since V.E. day the Admiralty had cancelled some 727 vessels, from fleet carriers downwards, whose total cost, had they been completed, was estimated at £158,000,000, of which approximately £32,500,000 had already been spent or was a liability under break-clause conditions, giving a net saving of £125,500,000.

PERSONNEL

PAY CODE MODIFIED.—The Admiralty announced on 6th March an important modification in the Pay Code issued on 19th December, 1945, in the White Paper concerning the pay of ratings and other ranks in the Services. The modification applies to arrangements for dealing with any reduction caused by the new Code. Transfer to the new Code will be made on 1st July, 1946, as originally announced, but any reduction which would have taken effect as compared with the old Code will not now be enforced, as at first intended, by half-yearly instalments. Instead, the excess will continue to be paid until absorbed in ordinary periodic increments. When any special duty which carries an allowance under the old Code but not under the new Code ceases to be performed, however, a proportionate reduction will be made.

JOINT ANTI-SUBMARINE SCHOOL.—It was announced on 30th January that arrangements had been completed for the establishment of a joint Admiralty and Air Ministry Anti-Submarine School. The permanent location has not yet been decided, but the School will be temporarily housed in Ebrington Barracks, Londonderry. Aircraft of the Royal Navy and Royal Air Force will operate from the R.A.F. stations at Ballykelly and Castle Archdale, and submarines and anti-submarine escort vessels will be based at London-

derry. The school will be under the joint directorship of a Commander, R.N., and a Wing Commander, R.A.F., under the general command of the Naval Officer-in-Charge, Londonderry.

MATERIAL

LAUNCH OF H.M.S. "EAGLE".—The aircraft carrier "Eagle" was launched by Princess Elizabeth on 19th March from the yard of Messrs. Harland and Wolff, Belfast. The Princess travelled from Greenock in the new cruiser, H.M.S. "Superb," escorted by the destroyers "Fame" and "Hotspur." After a tour in Northern Ireland, Her Royal Highness returned to Greenock in the "Superb" on 21st March.

H.M.S. "TRIUMPH" COMMISSIONED.—The new light fleet aircraft carrier "Triumph," 18,300 tons, was commissioned for trials on 9th April by Captain H. W. Falkner, R.N., on the Tyne.

DESTROYER FOR GREECE.—The British destroyer "Tanatside" was formally transferred to the Royal Hellenic Navy on 10th February by Vice-Admiral Sir Frederick Dalrymple-Hamilton, Vice-Admiral, Malta, and renamed "Adrias," after the Greek destroyer of that name which was sunk by a mine on active service in the Aegean on 22nd October, 1943.

TRANSFERS OF WARSHIPS.—In reply to a question in Parliament on 27th February, the First Lord, Mr. Alexander, said that warships of a total displacement tonnage of 260,064 had been transferred to foreign, Dominion, or Imperial Governments since 1st January, 1943. For those which had been sold a total sum of £3,014,206 would be paid.

WARSHIPS SCRAPPED.—Among a number of warships which it was recently approved should be scrapped is the battleship "Warspite" which fought at Jutland in 1916 and in many actions during the late war from Narvik in 1940 to Normandy in 1944. The cruiser "Cardiff"—another veteran of the Grand Fleet, and which in 1918 led the German High Seas Fleet to surrender in the Firth of Forth, and the destroyer "Scout", the oldest of her class (completed in 1918) are also being scrapped.

EXERCISES AND CRUISES

HOME FLEET.—The Home Fleet left Portland on 7th March for its first Spring cruise since 1939. It included the battleship "Nelson," flagship of the Commander-in-Chief, Admiral Sir Neville Syfret, the cruisers "Bellona," "Birmingham," and "Diadem," and the destroyers "Mynga," "Zest," "Zephyr," "Zambesi" and "Zenith." On passage to Gibraltar, exercises took place in the Bay of Biscay, in which R.A.F. aircraft co-operated. On 12th March the three cruisers left Gibraltar for Trinidad and various ports in the West Indies. On 21st March, the "Nelson" and destroyers left for a visit to Lisbon from the 22nd to 28th, where they were hospitably entertained by the Portuguese, and President Carmona visited the flagship. They returned to Portland on 31st March, carrying out further naval and air exercises during the passage. The cruisers continued their tour in the West Indies until 18th April.

VISIT TO TOULON.—Admiral Sir John Cunningham, Commander-in-Chief, Mediterranean, paid a visit to the French Fleet at Toulon in the last week of March, in the cruiser "Liverpool", escorted by four destroyers.

PROGRESS IN MINE CLEARANCE

On 29th March, the Admiralty announced some details of the progress made in the immense task of clearing the seas of the minefields laid during the late war. Over 12,000 mines had up to that date been swept since V.E. Day in European waters alone, more than half of them by British minesweepers. In British waters, only British minesweepers are at work. They are also helping in Dutch, Belgian, Mediterranean, and, in a supervisory capacity, in German waters.

WOMEN'S ROYAL NAVAL SERVICE

The Duchess of Kent, Commandant of the W.R.N.S., on 14th February inspected members of the Service in the Portsmouth area. Her Royal Highness went first to H.M.S. "Collingwood," at Fareham, and then returned to Portsmouth Dockyard, where she lunched on board H.M.S. "Sheffield"—a ship she had launched in 1936. In the afternoon, the Duchess inspected the W.R.N.S. at the Royal Naval Barracks, and after visiting H.M.S. "Vernon" took tea with the Commander-in-Chief, Admiral Sir Geoffrey Layton, in H.M.S. "Victory".

DEATH OF MISS E. M. GOODENOUGH. Miss Ethel Mary (Angela) Goodenough, C.B.E., Superintendent of the W.R.N.S., on the East Indies Station, died in hospital at Colombo on 10th February. On the revival of the W.R.N.S. in 1939 she was appointed a Deputy Director. She was made a C.B.E. in 1943.

ROYAL NAVAL VOLUNTEER RESERVE

The future of the permanent Royal Naval Volunteer Reserve has been under review by the Admiralty. All permanent officers were requested on 6th April to write to the new Commanding Officer of the Division to which they were attached on mobilization, stating any change of permanent address, and whether or not they wish to continue to serve.

Ratings who were serving with the R.N.V.R. on 2nd September, 1939, and who wish to consider re-enrolling should also communicate with the Commanding Officer of their nearest Division, giving full name, rating, official number, address, and any non-substantive qualifications held.

A number of temporary officers have expressed a desire to be considered for permanent commission in the R.N.V.R., and a further announcement was promised shortly by the Admiralty.

ROYAL MARINES

COMMANDANT GENERAL.—Major-General R. A. D. Brooks, C.B., C.M.G., D.S.O., R.M., was appointed Commandant General, Royal Marines, in succession to General Sir Thomas L. Hunton, K.C.B., M.V.O., O.B.E., R.M., to date from 30th April. Major-General Brooks was promoted to the rank of Lieutenant-General on taking up this appointment.

RETIREMENTS.—Major-General W. B. F. Lukis, C.B.E., (1st October, 1945); Major-General A. N. Williams, C.B.E. (3rd January, 1946).

PROMOTIONS.—Colonel Commandant (temporary Brigadier) T. H. Jameson, C.B.E., D.S.O., A.D.C., to be Major-General (1st January, 1946); Colonel Second Commandant (acting Major-General) H. T. Newman, C.B.E., to be Colonel Commandant, and to retain the rank of acting Major-General (1st January, 1946); Colonel Commandant (temporary Brigadier) A. H. E. Reading, A.D.C., to be Major-General (3rd January, 1946).

DOMINIONS AND COLONIES

CANADA

CHIEF OF NAVAL STAFF.—Vice-Admiral George Clarence Jones, Canadian Chief of Naval Staff, died suddenly in Ottawa on 8th February. During the later years of the War, he was responsible for directing the Royal Canadian Navy at the time of its greatest strength in men and ships, and the Prime Minister, Mr. Mackenzie King, said that the loss of his wide experience in naval defence matters would be greatly felt.

On 1st March, it was announced that Rear-Admiral Howard Emerson Reid had been promoted to Vice-Admiral and appointed to succeed him. He had been Canadian Naval Member with the Combined Chiefs of Staff at Washington, and was formerly Vice-Chief of Naval Staff at Ottawa, Member of the Canadian-United States Joint Board of Defence, and Flag Officer of the Newfoundland Forces when the Battle of the Atlantic was at its height.

NEW CARRIER.—A new light fleet aircraft carrier, H.M.C.S. "Warrior," was commissioned at Belfast on 24th January. She is the first modern aircraft carrier to be operated by a Dominion Navy, and is being lent by the Admiralty to Canada for the training of a naval air arm in the R.C.N. Captain Frank Llewellyn Houghton, R.C.N., of Ottawa, has been appointed in command. The commissioning ceremony was attended by Admiral Lord Granville, Governor of Northern Ireland, Mr. Vincent Massey, Canadian High Commissioner, and Rear-Admiral H. E. Morse, Admiral-Superintendent of Contract-built Ships.

War Losses.—The following losses were incurred by the Canadian Navy during the War:—6 destroyers; 1 frigate; 10 corvettes; 5 minesweepers; 7 M.T.B.'s; and 2 auxiliary vessels.

Post-War Strength.—The following is to be the post-war strength of the Canadian Navy:—2 Cruisers (H.M.C.S. "Uganda" and "Ontario"); 2 Aircraft Carriers; a number of destroyers and ancillary craft. There will be a permanent force of 10,000 men—384 officers and 5,625 ratings afloat, the rest ashore—and flying personnel for the carriers, recruited from Canadians in the Naval Air Arm. There will also be a force of 18,000 naval reservists to be known as the Reserve Royal Canadian Navy.

INDIA

FLAG OFFICER COMMANDING.—It was announced in Delhi on 6th March that Vice-Admiral Sir Geoffrey J. A. Miles had been appointed Flag Officer Commanding, Royal Indian Navy, in succession to Vice-Admiral John H. Godfrey, who on 22nd March would complete three years in this post.

TRANSFER OF CRUISERS.—In the House of Commons on 3rd April, the Prime Minister, Mr. Attlee, said that, subject to a satisfactory settlement of the question of price, the Government were prepared to transfer three "Leander" class cruisers to the Royal Indian Navy. It was hoped that the first of the transfers would take place about March, 1947.

FOREIGN NAVIES

BELGIUM

FORMATION OF NAVAL FORCE.—It was announced on 1st February, 1946, that the Belgian Cabinet had approved a decree for the formation of a naval force to consist of two or three frigates, including the fishery protection sloop "Artevelde" built in 1939, seized by the Germans and since returned; eight minesweepers which would assist in clearing the North Sea; and twelve fast launches for patrolling off the coast and in the Scheldt and combating Customs evasions. In wartime the force, for which about 500 men (volunteers or recruits from merchant shipping) would be called up each year, would act in liaison with the Allies.

FRANCE

WAR LOSSES.—The following were the losses of the French fleet during the War, including ships scuttled at Toulon:—2 battleships (both at Toulon); 2 aircraft carriers; 9 cruisers (2 at Toulon); 22 contre-torpilleurs (13 at Toulon); 39 submarines (14 at Toulon); about 100 auxiliaries.

POST-WAR STRENGTH.—The following is the post-war strength of the French Navy:—4 battleships; 2 aircraft carriers; 14 cruisers (including 4 light cruisers); 3 contre-torpilleurs (heavy destroyers); 14 destroyers; 28 submarines; about 300 auxiliaries.

BRITISH WARSHIPS FOR FRANCE.—Britain has lent France, for not more than five years, an aircraft carrier of the "Colossus" class.

The following ships of Britain's quota of German warships have also been transferred to France:—2 "Narvik" class destroyers of 2,400 tons; 2 "Leberecht Maas" class

destroyers of 1,625 tons; 2 "Elbing" class destroyers of 1,200 tons; 2 torpedo-boat destroyers of 600 tons; and the submarines U2348 and U2518; all of which were built during the War.

JAPAN

WARSHIP LOSSES.—*The United States Naval Institute Proceedings* of January, 1946, gives a very detailed list of the fate of the ships of the Japanese navy. The following is a summary of losses of the principal classes:—

Battleships

Sunk.—"Fuso," "Haruna," "Hiyei," "Hyuga," "Ise," "Kirishima," "Kongo," "Musashi," "Mutsu," "Yamashiro," "Yamato."

Heavily damaged.—"Nagato."

Aircraft Carriers

Sunk.—"Akagi," "Chitose," "Chiyoda," "Hiryu," "Hitaka," "Kaga," "Ryujo," "Shinano," "Shoho," "Shokaku," "Soryu," "Taiho," "Unryu," "Zuiho," "Zuikaku."

Heavily damaged:—"Amagi," "Hayataka," "Katsuragi," "Ryuho."

Lightly damaged:—"Hosho."

Escort Carriers

Sunk.—"Chuyo," "Kaiyo," "Jinyo," "Otaka," "Unyo."

Heavy Cruisers

Sunk.—"Aoba," "Ashigara," "Atago," "Chikuma," "Chokai," "Kurutaka," "Haguro," "Kako," "Kinugasa," "Kumano," "Maya," "Mikuma," "Mogami," "Nachi," "Suzuya," "Tone."

Heavily damaged.—"Myoko," "Takao."

Light Cruisers

Sunk.—"Abukuma," "Agano," "Isuzu," "Jintsu," "Kinu," "Kiso," "Kuma," "Nagara," "Naka," "Natori," "Noshiro," "Oi," "Oyodo," "Sendai," "Tama," "Tatsuta," "Tenryu," "Yahagi," "Yubari," "Yura."

Heavily damaged.—"Kitagami."

Destroyers

Sunk 134; *heavily damaged* 25; and *lightly damaged* 1.

Submarines

Sunk 129; and *heavily damaged* 1.

UNITED STATES

WARTIME CONSTRUCTION.—*The United States Naval Institute Proceedings* of January, 1946, gives the following ships as having completed for the U.S. Fleet between 7th December, 1941 and 1st October, 1945:—

Battleships

"South Dakota," "Indiana," "Massachusetts," "Alabama," "Iowa," "New Jersey," "Missouri," "Wisconsin."

Aircraft Carriers

"Essex," "Yorktown," "Intrepid," "Hornet," "Franklin," "Ticonderoga," "Randolph," "Lexington," "Bunker Hill," "Wasp," "Hancock," "Bennington," "Boxer," "Bon Homme Richard," "Antietam," "Shangri-La," "Lake Champlain," "Midway."

Light Aircraft Carriers

"Independence," "Princeton," "Belleau Wood," "Cowpens," "Monterey," "Langley," "Cabot," "Bataan," "San Jacinto."

Heavy Cruisers

"Baltimore," "Boston," "Canberra," "Quincy," "Pittsburg," "Saint Paul," "Columbus," "Helena," "Bremerton," "Fall River," "Macon," "Los Angeles," "Chicago," "Alaska," "Guam."

Light Cruisers

"Atlanta," "Juneau," "San Diego," "San Juan," "Cleveland," "Columbus," "Montpelier," "Denver," "Santa Fe," "Birmingham," "Mobile," "Vincennes," "Pasadena," "Springfield," "Topeka," "Biloxi," "Houston," "Providence," "Vicksburg," "Duluth," "Miami," "Astoria," "Oklahoma City," "Little Rock," "Oakland," "Reno," "Flint," "Tucson," "Amsterdam," "Portsmouth," "Wilkes-Barre," "Atlanta," "Dayton."

Also 77 escort carriers, 353 destroyers, 412 destroyer escorts and 204 submarines.

WARTIME LOSSES.—The following ships of the U.S. Navy were lost from various causes between 7th December, 1941 and 1st October, 1945:—

Battleships

"Arizona," "Oklahoma."

Aircraft Carriers

"Hornet," "Lexington," "Princeton," "Wasp," "Yorktown," 6 escort carriers.

Heavy Cruisers

"Astoria," "Chicago," "Houston," "Indianapolis," "Northampton," "Quincy," "Vincennes."

Light Cruisers

"Atlanta," "Helena," "Juneau."

Also 71 destroyers, 11 destroyer escorts, 52 submarines.

POST-WAR FLEETS.—The post-war Atlantic and Pacific Fleets will be built round 13 large carriers, augmented by 13 escort carriers and only 4 battleships. The 26 carriers will have 3,627 aeroplanes between them. These fleets will have behind them a "ready reserve fleet," in which will be 5 carriers and 6 battleships, while behind this there will be the rest of the wartime force in a "laid up reserve fleet." It will include 18 carriers, 62 escort carriers and 7 battleships.

PACIFIC FLEET.—It was officially announced on 8th April, 1946, that a "Fifth Fleet," based on San Diego, was being formed as the only striking force in the Pacific. It will consist of 5 or 6 carriers, 2 battleships, 8 cruisers, 36 destroyers and 2 squadrons of submarines.

The "Third Fleet" at San Francisco is strictly a reserve fleet, the "Seventh" at Shanghai is a patrol force, and that in Japanese waters contains no major striking units.

JET AIRCRAFT FOR CARRIERS.—The U.S. Navy is developing a jet-powered fighter aircraft for carrier operation. This is designated the FD/1 Phantom and is designed and built by the McDonnell Aircraft Corporation, St. Louis, Missouri. Its top speed is in excess of 500 m.p.h., and it has a service ceiling of over 40,000 feet. Nevertheless the landing speed is stated to be normal.

Primarily designed as an interceptor, it has an exceptionally high rate of climb and range of approximately 1,000 miles. Power is furnished by twin axial-flow Westinghouse turbo-jet engines built into the wing roots. Where take-off assistance is needed, either standard carrier catapults or JATO (Jet Assisted Take Off) units may be used.

AIR TRANSPORTS.—The Lockheed Company is constructing large transport aircraft for the U.S. Navy. They are to be twice the size of the Constellation and to carry 150 passengers.

ARMY NOTES

H.M. THE KING

The King and Queen visited the Khaki University of Canada at Leavesden, Watford, on 21st February.

The Princess Elizabeth was present at the Passing-out Parade of No. 161 Infantry (R.M.C.) O.C.T.U., at the Royal Military College, Sandhurst, on 28th February.

The Princess Elizabeth (Colonel, Grenadier Guards) visited the Guard's Depot, Caterham, on 4th April and inspected a company of the Grenadier Guards.

The Princess Elizabeth took the salute at a March Past of the Army Cadet Force in Hyde Park on 7th April.

The Princess Royal, Controller-Commandant, attended staff conferences of the A.T.S. in London on 6th February and 28th March. She visited units of the A.T.S. in Scotland on 15th, 18th and 19th February; at No. 6 A.F.V. Depot, Slough, the A.T.S. Reconditioning Centre, Cobham, and at Headquarters, Eastern Command, Hounslow, on 5th March.

The Princess Royal visited No. 1 Infantry Training Centre at Dreghorn Camp on 16th February, and on the same day inspected a parade of cadets of the Army Cadet Force of the Lothians, Peebles and Edinburgh.

The Princess Royal, Colonel-in-Chief, was present at the Royal Scots Commemoration Service in St. Giles' Cathedral, Edinburgh, on 17th February.

The King has approved the following appointments:—

TO BE AIDES-DE-CAMP TO THE KING.—Colonel (temporary Major-General) A. L. Collier, C.B.E., M.C. (25th December, 1945); Colonel (temporary Major-General) E. C. Beard, C.B.E., M.C. (15th January, 1946); Colonel (temporary Major-General) D. F. McConnel, C.B., C.B.E., D.S.O. (6th March, 1946); Colonel (temporary Brigadier) W. Carden-Roe, C.B.E., M.C. (9th February, 1946); Colonel (temporary Major-General) T. N. F. Wilson, D.S.O., M.C. (13th February, 1946); Colonel (temporary Brigadier) R. T. O. Cary, C.B.E., D.S.O. (14th March, 1946); Colonel (temporary Major-General) A. W. Lee, C.B., M.C. (15th March, 1946).

TO BE HON. PHYSICIAN TO THE KING.—Colonel (temporary Brigadier) H. A. Sandford, M.C., M.B., late R.A.M.C. (23rd January, 1946).

TO BE HON. SURGEONS TO THE KING.—Colonel (local Brigadier) D. Fettes, O.B.E., M.B., F.R.C.S., late R.A.M.C. (28th November, 1945); Colonel (temporary Brigadier) F. Harris, C.B.E., M.C., M.B., late R.A.M.C. (4th February, 1946).

TO BE COLONELS COMMANDANT.—Of the Army Catering Corps, Major-General (temporary Lieut.-General) Sir Humphrey M. Gale, K.B.E., C.B., C.V.O., M.C. (1st February 1946); of the 1st Battalion, King's Royal Rifle Corps, Major-General H. O. Curtis, C.B., D.S.O., M.C. (11th February, 1946); of the 2nd Battalion, King's Royal Rifle Corps, Major-General (acting Lieut.-General) Sir Evelyn H. Barker, K.B.E., C.B., D.S.O., M.C. (11th February, 1946); of the Royal Engineers, Major-General (hon. Lieut.-General) Sir Maurice F. Grove-White, K.B.E., C.B., D.S.O. (20th March, 1946).

TO BE REGIMENTAL COLONELS.—Of The Black Watch, Field-Marshal the Viscount Wavell, P.C., G.C.B., G.C.S.I., G.C.I.E., C.M.G., M.C. (1st March, 1946); of The York and Lancaster Regiment, Major-General G. W. Symes, C.B., M.C. (20th March, 1946); of The Sherwood Foresters, Lieut.-General H. B. D. Willcox, K.C.I.E., C.B., D.S.O., M.C. (8th February, 1946); of the 2nd Gurkha Rifles, I. A., Major-General (acting Lieut.-General) F. I. S. Tuker, K.C.I.E., C.B., D.S.O., O.B.E., I.A. (20th March, 1946); of The Sikh Light Infantry, I.A., Major-General (acting Lieut.-General) R. A. Savory, C.B., D.S.O., M.C., I.A. (29th March, 1946); of The South Staffordshire Regiment, Major-General Sir Guy de C. Glover, K.B.E., C.B., D.S.O., M.C. (6th April, 1946).

ARMY COUNCIL

The King was pleased by Letters Patent under the Great Seal bearing date 12th February, 1946, to appoint the following to be His Majesty's Army Council :—

The Right Hon. J. J. Lawson, President.

Colonel H. L. B. Nathan, T.D., Vice-President.

Field-Marshal Viscount Alanbrooke, G.C.B., D.S.O., A.D.C. General.

General Sir Ronald F. Adam, Bt., G.C.B., D.S.O., O.B.E.

Lieut.-General Sir Daril G. Watson, K.C.B., C.B.E., M.C.

Lieut.-General F. E. W. Simpson, C.B., D.S.O.

Lieut.-General Sir Sidney C. Kirkman, K.B.E., C.B., M.C.

Captain F. J. Bellenger.

Sir Eric B. B. Speed, K.C.B., K.B.E., M.C.

HONOURS AND AWARDS

Victoria Cross.—The King has approved the award of the Victoria Cross to :—

(a) *Lieutenant the Hon. C. Furness*, Welsh Guards (posthumous)—for outstanding gallantry between 17th and 24th May, 1940, when he displayed the highest qualities of leadership and dash, ending in a magnificent act of self-sacrifice against hopeless odds.

(b) *Honorary Major J. W. Foote*, Canadian Chaplain Service—for superb gallantry under heavy enemy fire during the Canadian action at Dieppe in August, 1942.

(c) *Warrant Officer Class II (Company Sergeant-Major) J. R. Osborn*, Canadian Infantry Corps (posthumous)—for superb heroism and self-sacrifice at Hong Kong on 19th December, 1941.

George Cross.—The King has approved the award of the George Cross, in recognition of most conspicuous gallantry in carrying out hazardous work in a very brave manner, to :—

Major (acting Brigadier) A. F. C. Nicholls, Coldstream Guards (posthumous).

Naik Kirpa Ram, 8/13th Frontier Force Rifles, Indian Army (posthumous).

The King has also approved the posthumous award of the George Cross, in recognition of most conspicuous gallantry while they were prisoners of war in Japanese hands, to :—

Colonel L. A. Newnham, M.C., The Middlesex Regiment.

Captain D. Ford, The Royal Scots.

Captain M. A. Ansari, 7th Rajput Regiment, I.A.

The following honours were announced on 29th January, 1946 :—

G.C.M.G..—Field-Marshal the Hon. Sir Harold Alexander, G.C.B., C.S.I., D.S.O., M.C., Governor-General Designate of Canada; and Lieut.-General Sir Bernard Freyberg, V.C., K.C.B., K.B.E., C.M.G., D.S.O., Governor-General Designate of New Zealand.

The following awards were included in those announced on 24th January, 1946, in recognition of gallant and distinguished services in North-West Europe :—

C.B..—Major-Generals (acting) P. M. Balfour, C.B.E., M.C. and W. d'A. Collings, C.B.E., and R. G. Feilden, C.B.E. and W. R. Revell-Smith, C.B.E., D.S.O., M.C., A.M.; Brigadiers (temporary) R. F. K. Belchem, C.B.E., D.S.O. and E. O. Herbert, C.B.E., D.S.O. and L. Wansbrough-Jones, C.B.E., and E. T. Williams, C.B.E., D.S.O.

The following award was announced on 8th February :—

G.C.I.E..—Lieut.-General Sir Archibald Nye, K.C.B., K.B.E., M.C., Governor Designate of Madras.

APPOINTMENTS

CHIEF OF THE IMPERIAL GENERAL STAFF.—Field-Marshal Viscount Montgomery, G.C.B., D.S.O., is to succeed Field-Marshal Viscount Alanbrooke, G.C.B., D.S.O., A.D.C. General, as Chief of the Imperial General Staff.

B.A.O.R.—Lieut.-General Sir Richard McCreery, K.C.B., K.B.E., D.S.O., M.C., is to be G.O.C.-in-C., British Army of the Rhine.

AUSTRIA.—Major-General J. S. Steele, C.B., D.S.O., M.C. is to succeed Lieut.-General McCreery as G.O.C.-in-C., British Troops in Austria.

GREECE.—Major-General (acting Lieut.-General) K. N. Crawford, C.B., M.C., has succeeded Lieut.-General Sir Ronald Scobie, K.B.E., C.B., M.C. as G.O.C.-in-C., British Troops in Greece.

WEST AFRICA.—Major-General N. M. S. Irwin, C.B., D.S.O., M.C. has succeeded Lieut.-General M. B. Burrows, C.B., D.S.O., M.C. as G.O.C., West Africa Command.

MIDDLE EAST.—Lieut.-General Sir Miles Dempsey, K.C.B., K.B.E., D.S.O., M.C., is to succeed General Sir Bernard Paget, G.C.B., D.S.O., M.C., as Commander-in-Chief, Middle East, early this Summer.

SOUTH-EAST ASIA.—Lieut.-General Sir Montagu Stopford, K.B.E., C.B., D.S.O., M.C., is to be Commander-in-Chief, Allied Land Forces, South-East Asia, *vice* Lieut.-General Sir Miles Dempsey.

Temporary Major-General H. Redman, C.B.E., has been appointed Chief of the General Staff, A.L.F.S.E.A.

BURMA COMMAND.—Major-General (acting Lieut.-General) H. R. Briggs, C.B.E., D.S.O., has been appointed G.O.C.-in-C., Burma Command, in succession to Lieut.-General Sir Montagu Stopford (30th January, 1946).

5TH DIVISION.—Major-General P. G. S. Gregson-Ellis, C.B., O.B.E., has been appointed Commander, 5th Division.

STAFF COLLEGE.—Temporary Major-General R. A. Hull, C.B., D.S.O., has been appointed Commandant, Staff College.

WAR OFFICE.—Acting Major-General C. Cansdale, C.B.E., has been appointed Director of Clothing and Stores, War Office.

INDIA.—Major-General (temporary Lieut.-General) Air Arthur F. Smith, K.C.B., C.B., D.S.O., M.C. has been appointed Chief of the General Staff, India (24th January 1946).

Major-General Sir F. I. S. Tuker, K.C.I.E., C.B., D.S.O., O.B.E., I.A., has been appointed G.O.C.-in-C., Eastern Command (21st January, 1946).

Colonel (temporary Major-General) A. C. Curtis, C.B., D.S.O., M.C., A.D.C., I.A., has been appointed Commander, Lucknow District (21st January, 1946).

Major-General D. D. Gracey, C.B., C.B.E., M.C., I.A., has been appointed Commander, XV Indian Corps, with acting rank of Lieut.-General.

Major-General (acting Lieut.-General) R. A. Savory, C.B., D.S.O., M.C., I.A., has been appointed Adjutant-General in India (15th March, 1946).

AUXILIARY TERRITORIAL SERVICE.—Chief Controller Dame Leslie Whateley has resigned her post as Director of the Auxiliary Territorial Service. She has been succeeded by Controller M. J. C. Tyrwhitt (who is a daughter of Admiral of the Fleet Sir Reginald Tyrwhitt).

PROMOTIONS

The following promotions have been announced :—

Generals.—The following Lieut.-Generals to be Generals :—Sir Alan G. Cunningham, K.C.B., D.S.O., M.C. (30th October, 1945); Sir H. Charles Loyd, K.C.B., D.S.O. (12th February, 1946).

Lieut.-Generals.—The following Major-Generals (temporary or acting Lieut.-Generals) to be Lieut.-Generals:—R. M. M. Lockhart, C.B., C.I.E., M.C., I.A. (23rd November, 1945, with seniority 3rd April, 1944); Sir Brian G. Horrocks, K.B.E., C.B., D.S.O., M.C. (12th February, 1946, with seniority 29th December, 1944).

The following Major-General (acting Lieut.-General) to be temporary Lieut.-General:—C. H. Gairdner, C.B.E. (16th March, 1946).

The following Major-Generals to be acting Lieut.-Generals:—Sir Frank W. Messervy, K.B.E., C.B., D.S.O., I.A. (8th December, 1944); G. I. Thomas, C.B., D.S.Q., M.C. (18th September, 1945); F. E. W. Simpson, C.B., D.S.O. (1st February, 1946); F. G. Wrisberg, C.B., C.B.E. (11th February, 1946); K. N. Crawford, C.B., M.C. (1st March, 1946); F. I. S. Tuker, K.C.I.E., C.B., D.S.O., O.B.E., I.A. (21st January, 1946).

Major-Generals.—The following Colonels (temporary or acting Major-Generals) to be Major-Generals:—R. Briggs, C.B., D.S.O. (16th January, 1946, with seniority 14th May, 1944); G. W. E. J. Erskine, C.B., D.S.O. (26th January, 1946, with seniority 1st June, 1944); A. C. Duff, C.B., O.B.E., M.C. (31st January, 1946, with seniority 11th June, 1944); D. Russell, C.B., C.B.E., D.S.O., M.C., I.A. (23rd November, 1945); E. P. Nares, C.B.E., M.C. (5th February, 1946, with seniority 20th December, 1943); W. J. Eldridge, C.B., C.B.E., D.S.O., M.C. (6th February, 1946, with seniority 27th December, 1943); E. T. L. Gurdon, C.B.E., M.C. (8th February, 1946, with seniority 29th May, 1944); A. M. Cameron, C.B., M.C. (11th February, 1946, with seniority 29th May, 1944); J. C. O. Marriott, C.V.O., D.S.O., M.C. (12th February, 1946, with seniority 8th February, 1944); C. H. Gairdner, C.B.E. (22nd February, 1946, with seniority 4th March, 1944); F. S. Clover, C.B.E., A.M.I.Mech.E., A.D.C. (26th February, 1946, with seniority 21st April, 1944); P. M. Balfour, C.B., C.B.E., M.C. (26th February, 1946, with seniority 2nd June, 1944).

The following Colonels (acting Major-Generals) to be temporary Major-Generals:—T. Scott, I.A. (8th June, 1945); M. E. Dennis, C.B., C.B.E., D.S.O., M.C. (21st February, 1945); E. M. Bastyan, C.B., C.B.E. (3rd December, 1945); W. R. Beddington, C.B.E. (26th February, 1946); C. S. Sugden, C.B.E. (12th February, 1946); W. A. Dimoline, C.B.E., M.C. (28th February, 1946); H. L. Longden, C.B.E. (1st March, 1946); S. Arnott, C.B.E., D.S.O., M.D. (12th April, 1946).

The following Colonels (temporary Brigadiers) to be acting Major-Generals:—W. H. Stratton, C.V.O., C.B.E., D.S.O. (20th June, 1945); H. P. Sparks, M.C. (14th July, 1945); J. D. Shapland, D.S.O., M.C. (22nd March, 1946).

The following Lieut.-Colonels (temporary Brigadiers) to be acting Major-Generals:—G. N. Wood, D.S.O., O.B.E., M.C., The Dorsetshire Regiment (14th October, 1944); L. C. Thomas, C.B.E., D.S.O., M.C., The Royal Northumberland Fusiliers (29th August, 1945); C. Lloyd, C.B.E., T.D., R.A. (1st February, 1946); J. B. Churcher, D.S.O., The King's Shropshire Light Infantry (10th March, 1946); J. E. Hirst, I.A. (21st January, 1946); R. C. O. Hedley, D.S.O., I.A. (30th January, 1946).

RETIREMENTS

The following General Officers have retired:—Major-General C. J. S. King, C.B., C.B.E., M.Inst.C.E. (26th January, 1946, with honorary rank of Lieut.-General); Major-General E. M. C. Clarke, C.B., C.B.E. (26th January, 1946); Major-General J. G. W. Clark, C.B., M.C. (31st January, 1946, with honorary rank of Lieut.-General); Major-General G. R. Smallwood, C.B., D.S.O., M.C. (5th February, 1946); Major-General A. R. Selby, C.B., C.B.E. (8th February, 1946); Major-General F. H. N. Davidson, C.B., D.S.O., M.C. (11th February, 1946); Major-General D. T. Richardson, C.B., M.C., M.B., late R.A.M.C. (4th February, 1946); Major-General Sir John N. Kennedy, K.B.E., C.B., M.C. (26th February, 1946); Major-General Sir John A. C. Whitaker, Bt., C.B., C.B.E. (26th February, 1946); Major-General H. O. Curtis, C.B., D.S.O., M.C. (8th February, 1946); Lieut.-General Sir Archibald E. Nye, G.C.I.E., K.C.B., K.B.E., M.C. (20th

March, 1946); Major-General F. G. Hyland, C.B., M.C. (5th April, 1946); General Sir A. F. Andrew N. Thorne, K.C.B., C.M.G., D.S.O. (8th April, 1946).

ARMY ESTIMATES

Introducing the Army Estimates in the House of Commons on 14th March, the Secretary of State for War (Mr. J. J. Lawson) said that the active strength of the British Army at the beginning of April would be about 1,400,000. It was hoped that this figure would come down to 650,000 by the end of this calendar year.

Mr. Lawson could give no indication of the eventual shape of our post-war Army. That problem, he said, was still very much under consideration. He did, however, make some statements on future policy in certain directions.

Our oversea liabilities would necessitate the retention of a long-service professional Army. The Government intend to maintain the regimental system as far as possible. They also intend to retain the identity of the bulk of first-line Territorial units. They will also fully support the Army Cadet Force. There is to be a single Army Cadet College, with an eighteen months' course, for embryo officers of the future. The Military College of Science will be reorganized on the most up-to-date lines.

Mr. Lawson was full of praise for the work of the Army education authorities and the A.B.C.A. during the past years. "It is my object," he said, "to build up this system and make it a permanent part of the Army of the future."

Early in his speech, after praising the excellent work of the Army as a whole, the Secretary of State paid a special tribute to our great Chief of the Imperial General Staff, Field-Marshal Lord Alanbrooke. Speaking later in the debate, Mr. Eden added his tribute to the "utterly selfless service" rendered by Lord Alanbrooke to this country.

Mr. Eden also called attention to the remarkable achievement of Field-Marshal Lord Alexander in the concluding stages of the campaign in Italy. "I should imagine," he said, "that seldom if ever in the history of any army have there been so many contingents from so many nationalities, races and creeds, as made up the force that Field-Marshal Alexander led to victory. To weld such an army into a victorious unit, at a time when inevitable and constant calls were being made on that army for other theatres, required the highest gifts not only of leadership, but, let me add, of diplomacy."

The Financial Secretary to the War Office (Mr. Bellenger), who wound up the debate, concluded his speech as follows:—"We are concerned to build a Regular Army in the future on the best possible foundation. We have already laid some of those foundation stones in the White Papers dealing with the officers' and other ranks' rates of pay, but . . . there is a great deal more to be done in connection with conditions of service, length of service, training and after service prospects. All these are being planned at the present time. It may not be possible for us to get 100 per cent. perfection, but we are determined that in future there shall be no possible chance of honourable Members saying that the Army is the Cinderella of the Services, and that the soldier is only wanted when the war is on. We are going to make good citizen soldiers."

THE ROYAL MILITARY ACADEMY, SANDHURST

It has been announced that the old officer-training institutions of Woolwich and Sandhurst are to be merged into one, located at Sandhurst and to be known as the Royal Military Academy, Sandhurst. This academy will be the normal avenue to a Regular Commission, although as heretofore a proportion of such Commissions will be offered to candidates by direct entry from the Universities and Auxiliary Forces.

The R.M.A., Sandhurst will be for the training of candidates for Regular Commissions in the Household Cavalry, Royal Armoured Corps, Royal Artillery, Royal Engineers, Royal Signals, Foot Guards, Infantry, Army Air Corps, Royal Army Service Corps, Royal Army Ordnance Corps and Royal Electrical and Mechanical Engineers.

Vacancies will be filled from two sources :—(a) candidates selected on the results of an entrance examination (age 17½ to 18½ years), and (b) candidates already serving in the ranks who will be chosen for qualities of leadership and will not undergo an entrance examination (age 18½ to 19½ years).

Both types must serve a minimum of six months in the ranks before entry. They must also be British subjects, the sons of British subjects, and of pure European descent.

The course will be eighteen months, but entrants accepted for the Royal Engineers' Royal Signals and R.E.M.E. will, after being commissioned, be given more advanced instruction at either a military or an outside educational establishment. The entrance examination will be held half-yearly.

While at the academy, cadets will be paid as other ranks. They will pay no fees at the academy, nor will there be any charge for books or appliances required for their studies.

GENERAL

BRITISH COMMONWEALTH OCCUPATION FORCE.—As mentioned in General Service Notes in the February issue of this JOURNAL (page 123), the land component of the B.C.O.F. for Japan includes one British-Indian division.

This division, under Major-General D. T. Cowan, C.B., C.B.E., D.S.O., M.C., I.A., includes :—

5th British Brigade (Brigadier R. S. McNaught, D.S.O.) comprising the 2nd Royal Welch Fusiliers, 2nd Dorsetshire Regiment and 1st Queen's Own Cameron Highlanders.

268th Indian Brigade (Brigadier K. S. Thimayya, D.S.O.) comprising the 5/1st Punjab Regiment, 1/5th Mahratta Light Infantry and 2/5th Royal Gurkha Rifles.

7th Light Cavalry, Indian Armoured Corps. Supporting arms and services.

PIPE BAND IN PRAGUE.—The pipe band of the 8th Battalion, The Argyll and Sutherland Highlanders, which went to Prague under the auspices of the British Council, left that place on 3rd April after a highly successful visit. The pipers received an enthusiastic welcome wherever they went.

ROYAL BERKSHIRE REGIMENT.—The Berkshire County Council have presented three engraved silver bugles to the Royal Berkshire Regiment in admiration of the "glorious exploits" of the Regiment in the Second World War.

ART SOCIETY.—The Army Officers' Art Society, in abeyance since 1939, is being revived and will hold its sixteenth exhibition of drawings, paintings and sculpture at the R.B.A. Galleries, Suffolk Street, early in 1947. Besides officers of the Army, the Society welcomes as exhibitors officers of the Royal Navy, Royal Air Force and auxiliary forces.

SYRIA VACATED.—The last contingent of British troops in Syria marched out of Damascus on 15th April.

DOMINIONS

CANADA

VICTORIA CROSS.—*Hon. Major J. W. Foote*, Canadian Chaplain Service, has been awarded the V.C. (see page 300). This is the only Victoria Cross to be awarded to an Empire chaplain in the late war, and the fifth for the service since the order was founded in 1856.

The Victoria Cross has also been awarded posthumously to *Warrant Officer Class II (Company Sergeant-Major) J. R. Osborn*, Canadian Infantry Corps.

AUSTRALIA

HONOURS AND AWARDS.—The following awards were announced on 14th February, in recognition of gallant and distinguished services in the South-West Pacific :—

C.B.—Major-Generals (temporary) A. H. Ramsay, C.B.E., D.S.O., E.D., and J. E. S. Stevens, D.S.O., E.D., Australian Military Forces.

COMMANDER OF B.C.O.F.—Lieut.-General H. C. H. Robertson, Australian Military Forces, has been appointed Commander-in-Chief, British Commonwealth Occupation Force in Japan in succession to Lieut.-General Northcott, who is to be Governor of New South Wales.

INDIA

REGIMENTAL TITLES.—It was announced in the *London Gazette* of 1st February, 1946, that the King had approved the following new designations:—

The Royal Regiment of Indian Artillery.

The Corps of Royal Indian Engineers.

RETURN FROM EUROPE.—The last fighting formation of the Indian Army in Europe, the 4th Indian Division, left Greece in February after fourteen months in that country.

FOREIGN ARMIES

CHINA

An agreement for the constitution of a single Chinese National Army by the fusion of the armies of the Central Government and the Yenan (Communist) Government was signed at Chungking on February 25th by General Chang-Chih-chung, for the Central Government, General Chou En-lai, for the Yenan Government, and General George C. Marshall, U.S. Special Ambassador to China. It provides for a peacetime Army of 108 divisions within twelve months, to be further reduced to sixty divisions six months later. Of the 108 divisions to be formed in the next twelve months, ninety will be composed of Central Government and eighteen of ex-Communist forces, each division consisting of not more than 14,000 men; in the second stage of demobilization the Government forces will be further reduced to 50 divisions and the Communist to ten, the total strength of the National Army after the complete reorganization being approximately 840,000 officers and men. President Chiang Kai-shek will remain C.-in-C. of the Armed Forces, exercising his command through the Ministry of National Defence and the National Military Council.

In an earlier statement on January 17th, the Vice-Minister of War, General Lin Wei-had announced that at the end of the War the Chinese Army had a strength of 253 divisions, many of which, however, were inferior to pre-war standards owing to the long war of attrition and the acute shortage of military supplies. Apart from the Army, guerrilla organizations were also being reorganized in the liberated territories, some 600,000 men of the total of 720,000 in these forces having been disbanded and the remainder incorporated into the Regular Army. North of the Yangtse some 180,000 "puppet" troops remained to be disarmed, which would be effected within four months.

UNITED STATES

SOUTHAMPTON.—On 4th March, Southampton conferred upon the 14th Major Port, Transportation Corps, of the United States Army the privilege of marching through the streets of Southampton with bayonets fixed, drums beating and colours flying.

AIR NOTES

GREAT BRITAIN

H.M. THE KING

It was announced on 22nd March that the King has appointed Air Chief Marshal Sir Arthur Sheridan Barratt as Gentleman Usher to the Sword of State, in the room of General Sir Lewis Stratford Tollemache Halliday, V.C., Royal Marines.

THE AIR COUNCIL

The Commanders-in-Chief of all the R.A.F. and Oversea Commands assembled at the Air Ministry on 11th, 12th and 13th March for a conference with the Chief of the Air Staff on the immediate problems facing the R.A.F., and in particular on plans for demobilization. This was the first occasion on which Marshal of the R.A.F. Lord Tedder had assembled his Commanders-in-Chief since he assumed the appointment of Chief of Air Staff on 1st January, 1946. It is proposed to hold further conferences at regular intervals to review progress in the reorganization of the R.A.F.

APPOINTMENTS

The following appointments were announced on the dates stated:—

1st February, 1946.

Air Marshal Sir H. E. Philip Wigglesworth to be Air Officer Commanding-in-Chief, British Air Forces of Occupation, and Chief of Air Division, Control Commission, Germany. Air Vice-Marshal A. P. Davidson to be Deputy Chief of Air Division, Control Commission.

13th February, 1946.

By Command of the King, the Prime Minister announces that Marshal of the Royal Air Force Sir Sholto Douglas has been appointed Commander-in-Chief of the British Forces in Germany, Military Governor of the British Zone of Germany, and British Member of the Allied Control Council for Germany, in succession to Field-Marshal Viscount Montgomery of Alamein, who has been appointed Chief of the Imperial General Staff from 26th June, 1946.

12th February, 1946.

Air Vice-Marshal Henry K. Thorold to be Senior Air Staff Officer, Flying Training Command.

Air Vice-Marshal Cecil A. Bouchier to be Air Officer Commanding, Air Group, British Commonwealth Occupation Forces, Japan.

Air Vice-Marshal James D. I. Hardman to be Air Officer in Charge of Administration, Air Command, South-East Asia.

9th March, 1946.

Air Vice-Marshal Alfred C. Collier to be Air Officer Commanding, Headquarters, No. 3 Group, Bomber Command.

Air Vice-Marshal Hugh S. P. Walmsley to be Air Officer, Transport Command, South-East Asia.

Air Vice-Marshal Cyril B. Cooke to be Director-General of Servicing and Maintenance, Air Ministry.

Air Vice-Marshal Thomas A. Warne-Browne, to be Air Officer Commanding, No. 43 Group, Maintenance Command.

14th March, 1946.

Air Chief Marshal Sir Guy Garrod, who was recently appointed to the Military Staff Committee of the United Nations, will also assume the duties of Head of the R.A.F. Delegation in the United States. He will have as his permanent representative in Washington Air Marshal Robert V. Goddard, recently serving as A.O.A. in Air Command, South-East Asia.

1st April, 1946.

Air Marshal Sir Roderick Carr is to be Air Officer Commanding-in-Chief, India, and to undertake the functions of Air Officer Commanding Base Air Force, South-East Asia.

Air Vice-Marshal C. E. Neville Guest is to be Senior Air Staff Officer, Air Command, South-East Asia.

PROMOTIONS

MEDICAL BRANCH.—Air Vice-Marshal Andrew Grant, C.B., C.B.E., to Air Marshal (1st March, 1946). Air Marshal Grant on this date succeeded Air Marshal Sir Harold E. Whittingham as Director-General of R.A.F. Medical Services.

RETIREMENTS

Air Chief Marshal Sir Christopher L. Courtney, G.B.E., K.C.B., D.S.O. (9th November 1945).

Air Marshal Sir John S. T. Bradley, K.C.B., C.B.E. (27th October, 1945).

Air Marshal Sir Philip Babington, K.C.B., M.C., A.F.C. (1st December, 1945).

Air Vice-Marshal Sir Victor H. Tait, K.B.E., M.C. (29th January, 1946).

Air Vice-Marshal Sir G. Ranald M. Reid, K.C.B., D.S.O., M.C. (20th January, 1946).

Air Vice-Marshal Sir Robert H. M. S. Saundby, K.B.E., C.B., M.C., D.F.C., A.F.C. (on account of medical unfitness for Air Force service), retaining the rank of Air Marshal (22nd March, 1946).

TECHNICAL BRANCH.—Air Vice-Marshal H. H. M. Fraser, C.B. (20th December, 1945).

Air Commodores (temporary Air Vice-Marsahls), retaining the rank of Air Vice-Marshal :—

A. J. Capel, C.B., D.S.O., D.F.C. (3rd November, 1945).

H. V. Champion de Crespigny, C.B., M.C., D.F.C. (6th November, 1945).

B. McEntegart, C.B., C.B.E. (9th November, 1945).

F. H. M. Maynard, C.B., A.F.C. (12th November, 1945).

W. A. B. Bowen-Buscarlet, C.B.E., D.F.C. (8th January, 1946).

E. A. B. Rice, K.B.E., C.B., M.C. (1st March, 1946).

E. B. C. Betts, C.B.E., D.S.C., D.F.C. (10th March, 1946).

TECHNICAL BRANCH.—Air Commodores (temporary Air Vice-Marsahls) retaining the rank of Air Vice-Marshal :—

E. D. Davis, C.B., O.B.E. (6th February, 1946).

O. G. W. G. Lywood, C.B., C.B.E. (29th March, 1946).

EQUIPMENT BRANCH.—Air Commodore (temporary Air Vice-Marshal) Sir E. William Havers, K.B.E., C.B., retaining the rank of Air Vice-Marshal (26th January, 1946).

Air Commodore C. G. Smith, C.B., C.B.E. (11th February, 1946).

MEDICAL BRANCH.—Air Commodore D'A. Power, C.B.E., M.C., retaining the rank of Air Vice-Marshal (12th January, 1946).

HALF PAY

Marshal of the R.A.F. Viscount Portal of Hungerford, G.C.B., O.M., D.S.O., M.C. (26th February, 1946).

Marshal of the R.A.F. Sir Arthur T. Harris, G.C.B., O.B.E., A.F.C. (6th March, 1946).

HONOURS AND AWARDS

Victoria Cross.—(See NEW ZEALAND).

George Cross.—The King has approved the award of the George Cross to:—

Acting Wing Commander Forest Frederick Edward Yeo-Thomas, M.C. and Bar, Croix de Guerre, R.A.F.V.R. (15th February).

Wing Commander Yeo-Thomas three times parachuted into France to organize and work with the French resistance movement, was eventually betrayed to the Gestapo, by whom he was brutally treated, spent some time in Buchenwald and in a Jewish extermination camp, and after a series of escapes and adventures reached the American lines. He endured the brutal treatment and torture without flinching and showed the most amazing fortitude and devotion to duty throughout his service abroad, during which he was under the constant threat of death.

PERSONNEL

PERMANENT COMMISSIONS.—An Air Ministry Order published on 31st January stated that the Air Ministry had decided that officers who had not previously applied for permanent commissions should now be given the opportunity of doing so, and that those who had applied and had not been informed of the decision should be invited to re-apply, so that more up-to-date information about their careers might be available for consideration by the Selection Board. Officers of the Administrative and Special Duties Branch, the Balloon Branch, and the R.A.F. Regiment had not formerly been eligible, but it was now desired to ascertain how many officers of these branches wished to be considered for permanent commissions if, at a later date, it was possible to include them in the field of selection. Applicants for permanent commissions in the General Duties Branch must as a rule have been under 30 on 1st January last, and applicants for permanent commissions in other branches must have been under 35 on that date. Older officers might apply, but would be selected only if they had outstanding qualifications. Applications had to be made by 30th April from home commands and by 31st May from oversea commands.

FIRST WOMAN CHAPLAIN.—The Air Ministry on 20th March announced the appointment as Chaplain of the Rev. Elsie Chamberlain. She will perform the ordinary duties of a Royal Air Force chaplain and be commissioned as a Squadron Officer in the W.A.A.F. Miss Chamberlain, who is 35, is a Congregationalist.

PAY CODE CONCESSION.—Action to avoid reductions in pay for R.A.F. men under the new pay code of December last (page 123, February JOURNAL) was announced by the Air Ministry on 8th March. The new code will come into operation on 1st July, and where it would involve a reduction for an airman, the difference—the "war excess," will be made up until it is overtaken by increments or increases in pay. Under the original arrangement war excess would have been withdrawn in half-yearly instalments from 1st January next. An airman who reverts to substantive rank will receive the war excess of his former higher rank. Airmen's marriage allowance will not be taxed until the financial year beginning in April, 1947.

METEOROLOGICAL SERVICE.—Replying to a question in the House of Commons on 3rd April, the Under-Secretary for Air, Mr. Strachey, said that the Air Ministry regarded the development of a British Meteorological Service of the very highest quality as a vital national interest. The Royal Air Force will be only one of the users of such a service.

Civil aviation, the maritime services, and agriculture will all become increasingly important users. Accordingly, our meteorology will be built up as a centralized national service, with a basically civilian status, fully capable of serving all its customers. Permanent staff of high quality will be recruited and offered the pay and conditions laid down in the recommendations of the recent Report on the Scientific Civil Service.

CRANWELL COLLEGE RE-OPENED.—It was announced on 7th March that the R.A.F. College, Cranwell, had reopened for the training of officers for air crew duties. It was closed as a Cadet college at the outbreak of the War and used as a service flying training school.

AIR TROOPING PROGRAMME.—On 23rd January, the Under-Secretary for Air announced in the House of Commons the adoption of the following recommendations by the Air Staff to reduce the number of accidents in the air trooping programme:—

- (1) A series of measures designed to check the effect of demobilization, as we have the utmost difficulty in keeping any team of skilled and experienced men together for more than a week or so.
- (2) The withdrawal of Stirling aircraft from the air trooping programme. An excessive number of man-hours are needed to maintain these aircraft.
- (3) Special steps to modify one particular mark of engine which had been giving trouble.
- (4) An increase in the number of meteorological aircraft working along the routes, and provision of more radio aids.
- (5) A considerable reduction in the all-up take-off weight of Liberator and Dakota aircraft.
- (6) A reduction in the number of passenger-carrying flights, and a corresponding increase in the number of training flights carried out by Transport Command.
- (7) The suspension during the winter months of the Bomber Command scheme for ferrying troops, mainly for leave, between this country and Italy.

AUXILIARY AIR FORCE

On 27th March, it was announced that the Reserve Command of the R.A.F. would be re-established in the immediate future. The twenty auxiliary squadrons which existed before the War will be re-created on their old territorial basis, and for the present the Air Training Corps will be maintained at a strength of 75,000. Discussions have been opened with the University authorities to determine at which Universities it will be possible to maintain University Air Squadrons. The utmost importance, it was stated, was attached to these non-regular forces, which it might be desirable to develop to a much greater extent than before the War.

AIR TRAINING CORPS

Air Marshal Sir Leslie Gossage, it was announced on 25th February, had resigned his appointment as Chief Commandant and Director-General of the Air Training Corps, and would be succeeded by Air Vice-Marshal Sir Alan Lees, who is directing the arrangements for the proposed re-establishment of auxiliary and reserve forces, an appointment he had held since August, 1945.

In a message to the A.T.C. on the occasion of its fifth anniversary, Air Marshal Sir Leslie Gossage stated that during the five years something like 500,000 young men had been members of the Corps. Not all of them stayed to complete their training before joining one of the fighting Services, but over 150,000 trained Cadets were provided for the R.A.F. and Fleet Air Arm alone.

DEPARTURE OF THE U.S. 8TH AIR FORCE

A ceremony at the bomber station at Honington, Suffolk, on 26th February, when the American flag was formally hauled down, marked the return to the R.A.F. of the last base in Britain used by the United States 8th Air Force. Brigadier-General Emil C. Kiel, last commander of the American Force, handed over the key of the station headquarters to Air Marshal Sir James Robb, Air Officer Commanding-in-Chief, R.A.F. Fighter Command. He said he did so with mixed feelings. This was the last of the 112 British stations which the 8th Air Force had used during their four years stay. In a

few minutes, the last aircraft of a once mighty air force would take off. The 8th would be gone from England, but England would never be gone from the minds of those who served with the Force.

Sir James Robb asked the General to convey the following message to General Carl Spaatz, Commanding General of the United States Air Forces: "Although to-day has seen the last physical tie between our two Services severed, yet something deeper and more enduring remains—the link of comradeship and mutual respect forged and tempered during our years of co-operation in the skies over Europe." Afterwards, the Air Marshal and other R.A.F. officers escorted General Kiel to the last Flying Fortress remaining under American control in this country. The Air Marshal shook hands with the General and the Fortress crew, and saluted in farewell as the bomber moved down the runway.

AIR STATION CHANGES

The Air Ministry states that Lympne aerodrome was handed over to the Ministry of Civil Aviation on 1st January, and has since functioned as a civil airport. All R.A.F. men have left, and the aerodrome is staffed by civilians.

It was announced in the House of Commons on 10th April that the R.A.F. ranges near Holy Island were no longer in use, and it was not intended to keep any of them for the post-war Air Force. They were in process of being cleared of unexploded missiles.

The last of the R.A.F. units which had been stationed in Denmark since 5th May, 1945, left the country on 1st April, when only about fifty men remained for the final change-over from the R.A.F. to British Overseas Airways.

MATERIAL

THE SPITFIRE SERIES.—Only one fighter aircraft has been in continuous production for the R.A.F. throughout the War period—the "Spitfire." It was "blooded" during the Battle of Britain and when the War came to an end it was still prominent in the Fighter Command. This famous line of aircraft now comes to an end with the latest version—the Spitfire Mk. 21. (See Frontispiece).

In the intervening years, more than twenty distinct types have been produced in quantity and the improvement in performance and fighting qualities has been outstanding. The top speed has been increased by over 25 per cent., the rate of climb has been doubled and the service ceiling increased by one-third.

The latest type has two variations, one with the conventional Spitfire cabin top and the other with an improved streamline cabin top which cuts down air resistance and greatly improves the pilot's rearward vision. This latter aircraft is known as the Spitfire Mk. 22.

A great deal of re-design has been carried out on the Spitfire 21. The fuselage has been strengthened and a new type of undercarriage designed and fitted. The Rolls Royce Griffon 61 engine in conjunction with a five-bladed Rotol Airscrew are used, and twin radiators of sufficient size to allow the aircraft to operate in the tropics, are incorporated. The wing area has been slightly increased and additional armour for the pilot's protection added. Every effort has been made to improve aerodynamic shape, notably a completely altered engine cowling, a fairing flap for the undercarriage wheel housing, a retractable tail wheel and a whip aerial.

Controllability in spite of increased power and speed has been fully maintained. Increased range is obtained by the use of extra tanks carried in the wing leading edge and behind the pilot, and provision is made to allow drop tanks of various capacities to supplement this. The result is a fighting aircraft of outstanding merit and a fitting end to the great efforts expended on Spitfire development.

THE AIR ESTIMATES

The Air Estimates for 1946-47 were published on 28th February as a White Paper (No. 85, price 1d.). They provided for a total sum of £255,500,000, and 760,000 officers and men.

Introducing the Estimates in Committee of Supply of the House of Commons on 12th March, the Under-Secretary of State for Air, Mr. Strachey, referred to the work of the R.A.F. in the concluding part of the War. He referred specially to the results of the strategic bomber offensive, not only because it was the principal effort of the R.A.F. but also because it was for a large part of the War the principal offensive effort of this country. He believed the final and culminating attacks on oil and transportation targets were the greatest achievement of the War in strategic bombing, and played a decisive part in the breaking of German resistance. By the bomber offensive the War was won with a far smaller cost of life to this country than it could have been in any other way.

On V.E. Day the strength of the R.A.F. was 1,110,000. On 31st December, 365,000 had been demobilized, and by 30th June next another 377,000 would have been demobilized. By 30th December next the R.A.F. would be down to 305,000, including women.

The Air Ministry had released 100 airfields and parts of 50 more since the New Year, in addition to 50,000 acres last year. They had released 4,500 non-industrial properties, which was two-thirds of those held, and another 1,000 would have gone by the end of June, leaving only 500.

The end of the War found us just over the threshold of a vast new technical revolution in the field of aviation, most profound of all because it was based on new methods of propulsion. The gas turbine engine was the key to the situation, and in this Great Britain had undoubtedly the leadership. It opened the opportunity, if we develop our research to the utmost degree, of incalculable advantages.

This fact was recognized in the new arrangements for research, centralized in the Ministry of Supply, to cost £28,000,000. This substantial sum may prove to be a very small figure compared with the benefit which will accrue by devoting it to aviation research.

As to the future of the R.A.F., we do not know the kind of world in which we are going to live and therefore the functions which the Air Force will have to perform in it. The real safety of all people lies in a world force capable of enforcing the will of the United Nations Organization, and for that supreme purpose air forces are the most suitable instruments.

Meanwhile, the R.A.F. has police functions in the world to-day. He was able to announce a reduction in the overseas tour of duty. Single men would, from 1st April, have their tour reduced from 3½ to 3 years, bringing them to the same level as married men.

After referring to the revival of the Auxiliary and University Squadrons, he said that the Air Council viewed the continuance of the Women's Auxiliary Air Force as an essential operational factor of the R.A.F., but they must await the announcement from all three of the Forces on the future of the women's services.

AIR COMPONENT FOR JAPAN

Details of the Joint British Commonwealth Force to take part in the occupation of Japan were published on 1st February. It includes an Air Component, comprising squadrons drawn from the R.A.F., the Royal Australian Air Force, the Royal New Zealand Air Force, and the Royal Indian Air Force. The Air Component is commanded by Air Vice-Marshal C. A. Bouchier, R.A.F., and includes an Australian fighter wing, Spitfire squadrons of the R.A.F. and Royal Indian Air Force, a Corsair squadron of the Royal New Zealand Air Force, and a medium transport squadron of the R.A.F.

DOMINIONS AND COLONIES

CANADA

Details of the peace-time organization of the Royal Canadian Air Force were announced on 22nd February by Colonel Colin Gibson, Canadian Minister of National Defence for Air. The strength will include over 30,000 of all ranks, a regular force of 16,100 capable of rapid expansion, an auxiliary force of 4,500, and a reserve of 10,000 composed almost entirely of officers and airmen with war service.

Present commands will be continued at Vancouver, Trenton (Ontario), Winnipeg and Halifax, and the existing functional command will be maintained at Uplands, near Ottawa.

The regular air force will include eight operational squadrons, charged with the air defence of Canada. Great importance will be attached to the auxiliary force as an integral part of the R.C.A.F., and ultimately it will include 15 auxiliary squadrons. These will be given numbers of R.C.A.F. squadrons which served in the War.

NEW ZEALAND

The King has conferred the Victoria Cross for conspicuous bravery on:—

Squadron Leader Leonard Henry Trent, D.F.C., R.N.Z.A.F., No. 487 (R.N.Z.A.F.) Squadron, Bomber Command.

On 3rd May, 1943, Squadron Leader Trent was detailed to lead a formation of Ventura aircraft in a daylight attack on the power station at Amsterdam. The importance of bombing it, regardless of enemy fighters or anti-aircraft fire, was strongly impressed on the air crews taking part in the operation. Before taking off Squadron Leader Trent told the deputy leader that he was going over the target, whatever happened.

All went well until the eleven Venturas and their fighter escort were nearing the Dutch coast. Then one bomber was hit and had to turn back. Suddenly large numbers of enemy fighters appeared. Our escorting fighters were hotly engaged and lost touch with the bombing force. The Venturas closed up for mutual protection and began their run up to the target. Unfortunately, the fighters detailed to support them over the target had reached the area too early and had been recalled, and the bombers were attacked by 15 to 20 Messerschmitts which dived on them incessantly. Within four minutes six Venturas were destroyed. Squadron Leader Trent continued on his course with the three remaining aircraft. In a short time two more Venturas went down in flames, but he completed an accurate bombing run and even shot down a Messerschmitt at point blank range. Dropping his bombs in the target area he turned away. The aircraft following him was shot down on reaching the target. Immediately afterwards his own aircraft was hit, went into a spin, and broke up. Squadron Leader Trent and his navigator were thrown clear and became prisoners of war. The other two members of the crew perished. On this, his twenty-fourth sortie, Squadron Leader Trent showed outstanding leadership.

The navigator, Flight Lieutenant Vivian Phillips, R.A.F., was on 5th March awarded the D.S.O.

INDIA

A technical mission consisting of Mr. J. V. Connolly and Mr. R. Barrett, of the Ministry of Aircraft Production, and Mr. J. D. North and Mr. S. P. Woodley, nominated by the Society of British Aircraft Constructors, left for India in March at the invitation of the Government of India to advise on the technical aspects of the establishment of an aircraft industry in that country.

REVIEWS OF BOOKS

GENERAL

Let the Great Story be Told. (The truth about British expansion.) By H. Wood Jarvis. Foreword by the Rt. Hon. The Lord Queensborough, G.B.E. (Sampson Low, Marston & Co.), 18s.

The author of this fascinating book rescues from partial and wholly-unmerited oblivion a number of fine builders of the British Commonwealth. He omits the tale of the achievements of the more famous architects such as Gilbert, Clive and Wolfe, except in so far as is necessary to the continuity of the narrative. He rightly claims that but few Britons could adequately describe the vast services rendered, in the face of almost incredible obstacles, by such giants of purpose and action as John Smith, Flinders, Bass, Banks, Marsden and Wakefield. In these pages he produces a series of monographs, each centred round one of his heroes riding in cavalcade along the path leading to the creation of a mighty yet free and tolerant empire.

It is astounding how few of us are aware, despite his almost miraculous achievements, of the doings of Captain John Smith, except perhaps for the romance of his delivery from death by the Princess Pocahontas. Yet no man had a more amazing career. From his first campaign in the Netherlands at the age of sixteen until he sailed as a colonist for Virginia, he passed through a myriad of hair-raising adventures and hair-breadth escapes. It was not, however, until the little fleet reached its destination that his constructive work began. Condemned to the gibbet on wholly false accusations, he was landed in irons. A trial, demanded by the chaplain, cleared him, and, thereafter, he became the solid support, whether in peace or war, of his hybrid companions. Time and again but for him the first group to succeed in colonizing America would have been swept away by Redskins or starvation. Worthy as a citizen, doughty as a warrior, he became their President, and, through his success in holding to his bridgehead, has been hailed "as the real founder of the British Empire overseas."

From the doings of the Virginia Company, the author turns to the concurrent actions of the East India Company. The founder and first governor of that Company was another Smith—Sir Thomas of that ilk—and, with him, Hakluyt, as with all overseas ventures, was closely associated. Its activities were confined at first mainly to the East Indian islands. There it had to compete with an aggressive Dutch Company, fully supported by the Netherlands Government, which, in the end, largely in consequence of the brutal execution of the British residents of Amboyna, compelled it to divert the whole of its activities to India. The outrage was epoch making in its incidence. It forced the Company, instead of dispersing its efforts over the whole Far Eastern arena, to concentrate them on the mainland. By doing so, it enabled English trade to gain a firm footing in India.

The founding of the first trading station was, however, a matter of supreme difficulty. For a hundred years, the Portuguese, based on Goa, had controlled Indian waters, and they were therefore unlikely to admit a rival unchallenged. Thus, when Captain Thomas Best arrived with two armed merchant ships at Surat and obtained permission to found a factory there, the Portuguese at once despatched a fleet of four galleons and thirty rowed-galleys to attack him. In spite of the immense disparity of force, Best defeated them. Three weeks later, the attack was renewed with like result. After a lull of two years, Captain Nicholas Downton, fighting in the same arena with four ships against the whole Portuguese fleet of nine galleons and sixty galleys, inflicted another severe repulse on the enemy. These victories destroyed Portuguese prestige and ended their hegemony of Indian waters. Later, we are told, when the English suffered a decline in favour because the Great Mogul despised traders as a class, it was decided to despatch Sir Thomas Roe—a man of outstanding sagacity and presence—to that potentate's court. Coldly received, he eventually won, by his firmness and dignity,

the warm friendship of the Mogul and thereby obtained many priceless privileges for the Company.

The narrative then deals briefly with the founding of Calcutta by Job Charnock, the struggle between Clive and Dupleix and the term of Wellesley as a proconsul. Turning to the Pacific, it describes the hoisting of the British flag by Captain Cook in New Zealand and Australia and the charting by that immortal navigator, greatly assisted by Flinders and Bass, of Australian waters. It throws a limelight on Joseph Banks, "Father of Australia" and sponsor of many schemes of oversea venture, then on to Samuel Marsden, the "Apostle of New Zealand" and on to the more widely known Stamford Raffles—the founder of Singapore. Next, we are told of the life of Wakefield—how he encouraged and organized emigration and how he assisted Lord Durham to draft the document wherein the vital principle of granting self-government within the Commonwealth was born.

The last chapter is devoted to South Africa—to the unhappy tale of needless conflict twixt Boer and Briton, created and largely sustained by well-intentioned, humanitarian statesmen who stood for "a colour-blind liberty and equality," both obnoxious to, and were it implemented suddenly, dangerous to, the Boer farmer. It was a policy that eventually drove him northward on the Grand Trek and so to the widening of the gap, both in space and understanding, between the races. The chapter includes details of the fine work done by several individuals—by Sir Harry Smith, by the Governor D'Urban, by Rhodes, whose wonderful performance was unhappily marred by his connection with the Jameson Raid, by Hofmehr and, finally, by the greatest of our modern empire-builders—General Smuts.

The story as a whole makes a wonderful pageant, of which, in all humility, we may well be proud.

Arms and Policy, 1939-1944. By Hoffman Nickerson. (Putnam & Co., Ltd.) 17s. 6d.

This "study of recent strategy and policy" by an American, well known as a military writer in the United States, should interest British readers.

Most of the volume was compiled whilst the late war was still in progress, but the final portion was evidently not completed till August 1945, and some comments on the implications of the atom bomb are included. Part I, of some eighty pages, summarizes politico-military history from the Napoleonic wars up to 1939. Part II, about twice as long, is an able summary of the latest war up to the end of 1944. Part III, "Lessons," about one hundred pages long, sets forth the author's views in four chapters entitled "The Triumph of the Gun," "Air Power and Team Play," "U.S. Military Policy: Imperialism or Defence," and "Must we have World War III?" This Part III is not the least interesting portion of the book.

The book is well written, very readable, provocative and thought-inspiring. As a whole the narrative portion is commendably objective. What may seem to us an American bias appears in places, but this is perhaps only natural.

The author has some forthright views. He has ideas about this country which will surprise some readers. He praises our "internal unity which is the chief mark of an aristocratic state." Elsewhere he states: "Such unity goes far to offset the disadvantages inseparable from class government of aristocratic states." As for the British Empire, he says: "To the forty-odd millions of Britshers on their little island, empire is not a luxury but a necessity. Without the profits of empire masses of them could not live," and elsewhere: "Most of the British people without tribute from overseas must migrate or starve." Evidently he still imagines the Dominions to be tributary states instead of independent nations linked to the United Kingdom only by the tie of the Crown and affection for the Mother Country.

Militarily, Mr. Nickerson, while fully realizing the importance of air power in modern war, has little use for strategic bombing. As for future American military policy,

he is definitely opposed to "imperialism" and the extension of United States military commitments. He is entirely antagonistic to peacetime conscription for the American Army.

His final chapter on "Must we have World War III" aims at "diagnosing the disease" which causes war. Having dealt with the German virus which brought about the last two great wars, he is led irresistibly to discuss the discordant note which is being struck in to-day's World affairs by Soviet Russia. "But does all this add up to a necessity for war between the United States and the Soviet?" he asks; and answers at once "By no means." But he senses the danger to peace of the "almost impenetrable barrier" with which the Soviet government seems to desire to surround Russia and "the black curtain of secrecy" which has fallen, not only in their own country, but wherever their armies have conquered. He sees in this predilection for secrecy something potentially sinister. Some of his arguments are coloured by his evident anti-left political bias; but they are none the less interesting as coming from the land which makes a cult of freedom.

Peace in our Time. By Brigadier E. C. Anstey, D.S.O. (Frederick Muller Ltd.) 3s. 6d.

Apparently this brief, readable study of the military problems of the post-war period was written early in 1945 and finally brought up to date about June that year, before the war with Japan had ended. A good deal has happened since then.

The main problem discussed in the book is how to prevent the resurrection once again of Germany as an aggressor. In one place, however, the author does say: "When Nazi-ism is extinguished, temporarily or apparently permanently, can we assume that no other nation will try to have its way by force? The justification for such an assumption is gravely in doubt, especially if the opportunity for the use of force is offered by the absence of armed strength to prevent it."

The final chapter on "International Forces" is to be noted especially for its exposition of the practical difficulties underlying the conception of an international force to be at the disposal of the United Nations Organization.

The War : Fifth Year. By Edgar McInnis. (Oxford University Press.) 10s. 6d.

The latest instalment of this history carries the story of the War to the end of September 1944. The Governor-General's Medal for the best book of non-fiction to be written by a Canadian in the year 1944 was awarded to Professor McInnis for his *The War : Fourth Year*; and the high standard of previous volumes is well maintained in the fifth one.

The author covers the whole immense area of the latest world war in masterly fashion, with a fine sense of proportion. His narrative can only be a contemporary history in broad outline, but as such the work is outstanding. There is no lack of comment, apart from pure narrative of events, and the writer evidently aims at an objective and impartial treatment of his subject. Even so, inevitably not everyone will agree with some of his judgments.

ARMY

Malta Strikes Back : The Story of 231 Infantry Brigade. By Major R. T. Gilchrist. (Gale and Polden, Ltd.) 6s.

This is a brigade history of high quality. It will appeal not only to members of the regiments concerned and their relatives and friends, but will interest most soldiers. Sober, concise and yet full of detail, the narrative is skilfully written with numerous light touches and is always clear and most readable. Praise is given where praise is due, but there is no flamboyance or advertisement.

The story, covering the period from the end of 1941 to September 1943, is concerned mainly with the record of three fine Regular infantry battalions—the 2nd Devonshire,

1st Hampshire, and 1st Dorsetshire. These were the units composing the 1st Malta Infantry Brigade during the early years of the late war. The ordeal of Malta in 1942 is well described in a short opening chapter. In March 1943, the three battalions were moved to Egypt, where they became the 231st Brigade, part of the XXX Corps of the Eighth Army. Very soon they were expanded to a brigade group, with numerous other units attached, under the command of Brigadier R. E. Urquhart. For several months intensive training in combined operations for the impending attack on Sicily was carried out.

The major portion of the book is an able narrative of the operations of the 231st Brigade Group in the Sicilian campaign of July-August 1943. Herein the work of the brigade group was outstandingly good. Near the end of the volume comes an account of the landing on the toe of Italy near Pizzo on 8th September. The story ends shortly after that, for on 20th September 1943 "it was announced that all the men of the Brigade Headquarters (including the author) and in the battalions who had either served in Malta or fought right through the Sicilian campaign were being sent home to England."

Major-General Urquhart contributes a Foreword from which the following may be quoted:—

"The Brigade Group behaved magnificently. . . . The excellence of their spirit and of the state of training within units was amply proved throughout Sicily and again when they carried out a left hook up the coast of Italy in the early days of the invasion of that country. In the latter operation events did not work out according to plan, and it was the high standard of training and of the trust of all ranks which converted what might have been an unfortunate operation into a very marked success."

It should be noted that the Publishers have agreed to pay all royalties on the sale of this book to the honorary secretaries of the Old Comrades Associations of the Devonshire, Hampshire, and Dorsetshire Regiments.

The Enemy at the Gate: A Book of Famous Sieges. By Reginald Hargreaves. (Macdonald and Co. Ltd.) 15s.

The twelve sieges here described are arbitrarily chosen, and no claim is made for them to be the most famous in the history of warfare. Those selected in which the British were involved are Londonderry (1689), Gibraltar (1779-1783), Acre (1799), Sevastopol (1854-1856), Lucknow (1857) and Mafeking (1899-1900). The story of each siege is told at some length, with plenty of breezy comment.

This is a "chatty" book, more suitable perhaps for the general reader than for the military student. The exuberance of the author's style and the forthright manner in which he expresses his views may not appeal to everyone, but the narrative is certainly not dull.

My Recollections of Wellington College. By George F-H. Berkeley. (R. H. Johns, Ltd.) 8s. 6d.

Wellington has always been pre-eminently a school for embryo officers of the Regular Army, and among our readers there must be many—and not necessarily only Old Wellingtonians—who will appreciate this cheerful and kindly book of reminiscences. The author was in his school Eleven for four years, 1886-89, and in the Oxford University Eleven from 1890 to 1893. It is natural, therefore, that cricket and cricket anecdotes come largely into the picture.

ADDITIONS TO THE LIBRARY

GENERAL

BEHIND THE JAPANESE MASK. By Sir Robert Craigie. 8vo. (Hutchinson 1946.) 21s.
The memoirs of a British Ambassador.

PEACE IN OUR TIME. By Brigadier E. C. Anstey. 8vo. (Muller 1945.) 3s. 6d.
Presented by the Author.

THE RASMUSSEN REVOLVING GUNS. By Arne Hoff. (Nordlundes Bogtrykkeri, Copenhagen 1946.) Presented by the Publishers. The centenary biography of a famous gunmaker, publication of which was held up until now by the War.

RADAR. A Report on Science at War. (Pamphlet by U.S.A. Government Printing Office. Reprinted by H.M. Stationery Office, 1945.) 1s.

WHAT THEY SAID AT THE TIME. By Kathleen Freeman. 8vo. (Muller 1945.) 15s.

ESCAPE AND LIBERATION. 1940-1945. By A. J. Evans. 8vo. (Hodder & Stoughton 1945.) 10s. 6d.

HOME TO INDIA. By Santha Rama Rau. 8vo. (Gollancz 1945.) 6s. The Reactions of a Hindu girl returning to India after being educated in England.

ADVENTURES BY SEA OF EDWARD COXERE. Edited by E. H. W. Meyerstein. 8vo. (Clarendon Press 1945.) 7s. 6d.

THE SIEGE OF LONDON. By Robert Henrey. 8vo. (Dent 1946) 12s. 6d. London during the Flying Bomb Attacks.

THE PACIFIC WORLD. Edited by Fairfield Osborn. 8vo. (Allen & Unwin 1945.) 12. 6d.

THE ENEMY AT THE GATE. By Reginald Hargreaves. 8vo. (MacDonald 1946.) 15s.
Presented by the Publishers. The Story of certain well-known sieges.

LA TRAGEDIE DE MERS EL-KEBIR. Par Albert Kammerer. (Pamphlet by Médicis, Paris 1945.) 54 frs. Presented by the British Council.

LA RECONQUETE DE BIR-HAKIM A COLMAR. Par Bernard Simiot. (Pamphlet by Flammarion, Paris 1945.) 45 frs. Presented by the British Council.

LA GUERRE DU PACIFIQUE. Par René la Bruyère. 8vo. (Payot, Paris 1945.) 180 frs.
Presented by the British Council.

L'EPOPEE LECLERC AU SAHARA. Par Général Ingold. 8vo. (Berger-Levrault 1945.) 125 frs. Presented by the British Council.

THE KRIEGIE EDITION—"THE YORKSHIRE POST". A bound volume of prose, poetry and sketches by the prisoners-of-war in Stalag Luft VI. Presented by "The Yorkshire Post."

REPORT ON THE RUSSIANS. By W. L. White. 8vo. (Eyre & Spottiswoode 1945.) 10s. 6d. An open-minded account of a six weeks tour through the Soviet Union by a well-known American correspondent.

HISTORY AND THE READER. By G. M. Trevelyan. 8vo. (Cambridge University Press 1946.) 2s. 6d.

THE BRONZE CROSS. By F. Gordon Roe. 8vo. (Gawthorn 1945.) 10s. 6d.
Recipients from its inception to 1945. (This is a reference book and will not be sent out on loan.)

ARMS AND POLICY 1939-1944. By Hoffman Nickerson. 8vo. (Putnam, New York 1945.) 17s. 6d. Presented by the Publishers.

HORNED PIGEON. By George Millar. 8vo. (Heinemann 1946.) 10s. 6d.

CHINA—HER LIFE AND HER PEOPLE. By M. Cable and F. French. 8vo. (University of London Press 1946.) 5s.

BRITISH COMMONWEALTH OBJECTIVES. Edited by Sir Harry Lindsay. 8vo. (Joseph 1946.) 10s. 6d.

VICTORS BEWARE. By Salvador de Madariaja. 8vo. (Cape 1946.) 10s. 6d.

INDIA—A RE-STATEMENT. By Sir Reginald Coupland. 8vo. (Oxford University Press 1946.) 12s. 6d.

ENGLISH SAGA. 1840-1940. By Arthur Bryant. 8vo. (Collins 1946 Edition). 12s. 6d.

LET THE GREAT STORY BE TOLD. By H. Wood Jarvis. 8vo. (Sampson Low 1946.) 18s. Presented by Lord Queenborough.

PERSIA AND THE POWERS. By A. H. Hamzavi. 8vo. (Hutchinson 1946.) 7s. 6d.

GERMANY FROM DEFEAT TO CONQUEST. By W. M. Knight-Patterson. 8vo. (Allen & Unwin 1945.) 21s.

EUROPEAN DATELINE. By Patrick Maitland. 8vo. (Quality Press 1946.) 15s.

THE REVOLUTION IN WARFARE. By B. H. Liddell Hart. 8vo. (Faber 1946.) 5s.

REPORT ON RUSSIA. By Paul Winterton. 8vo. (Cresset Press 1945.) 6s.

I'LL WALK BESIDE YOU. By Mary Trevelyan. 8vo. (Longmans 1946.) 6s. Presented by the Publishers. Seventeen letters written from Brussels by a Y.M.C.A. worker during the last nine months of the European war.

SPEAKING GENERALLY. By General Sir Archibald Wavell. 8vo. (MacMillan 1946.) Presented by the Publishers, Wartime broadcasts, orders and addresses given by Field-Marshal Lord Wavell when C.-in-C. Middle East (1939-41.) and India (1941-43).

MY RECOLLECTIONS OF WELLINGTON COLLEGE. By George F.-H. Berkeley. 8vo. (Johns, Newport, Mon.) 8s. 6d. Presented by the Publishers. (This book has been placed in the Reading Room.)

THE TWENTY-FIRST QUARTER. By Philip P. Graves. 8vo. (Hutchinson 1946.) 12s. 6d.

NAVAL

H.M.N.Z.S. "Philomel." A History of the Training and Depot Ship of the Royal New Zealand Navy. (Pamphlet by Wilson & Horton Ltd., Auckland 1944.) 2s. Presented by the Admiralty.

MILITARY

THE HISTORY OF THE 3RD MEDIUM REGIMENT, ROYAL ARTILLERY 1939-1945. 8vo. (Private.) Presented by the Regiment.

MALTA STRIKES BACK. The Story of 231 Infantry Brigade. By Major R. T. Gilchrist. 8vo. (Gale & Polden 1946.) 6s. Presented by the Publishers.

FROM PACHINO TO ORTONA. The Canadian Campaign in Italy and Sicily 1943. (The Canadian Army at War No. 2. Published by the Ministry of National Defence, Ottawa.) 25c. Presented.

BURMESE OUTPOST. By Antony Irwin. 8vo. (Collins 1945.) 10s. 6d.

JUNGLE, JUNGLE, LITTLE CHINDIT. By Major Patrick Boyle and Major Jon Musgrave-Wood. 8vo. (Hollis & Carter 1946.) 12s. 6d. After the style of "Duffer's Drift." A lot of sound soldiering told humourously.

BEYOND THE CHINDWIN. By Bernard Fergusson. 8vo. (Collins 1945.) 10s. 6d.

THE CAMPAIGN OF MAY 1940. (The Official Report issued by the Belgian Government.) Presented by the Belgian Military Attaché. (This book will not be sent out on loan.)

A DIARY OF EVENTS. 6th Battalion The York and Lancaster Regiment during the Campaigns in North Africa and Italy, 1943-45. (Private.) Presented by Lieutenant-Colonel J. H. Cubbon, O.B.E., The 22nd (Cheshire) Regiment.

HISTORIQUE DE LA 1ERE BRIGADE D'INFANTRIE "LIBERATION." (Official typescript of the Belgian Forces which fought with the British Army in various theatres of war 1939-45.) Presented by the Belgian Military Attaché.

AIR

THE ROYAL AIR FORCE AND U.S.A.A.F. By Air Commodore L. E. O. Charlton. 8vo. (Hutchinson 1946.) 21s.

ENEMY COAST AHEAD. By Wing Commander Guy Gibson, V.C. 8vo. (Joseph 1946.) 12s. 6d.

DICTIONARY OF AERONAUTICAL TERMS. By Group Captain H. Nelson. 8vo. (Pitman 1946.) 10s. 6d.

CLOUD READING FOR PILOTS. By A. C. DOUGLAS. 8vo. (Murray 1943.) 10s.

AIR POWER IN WAR. By A. H. Narracott. 8vo. (Muller 1945.) 8s. 6d.

FORGOTTEN SKIES. By Wing Commander W. W. Russell. 8vo. (Hutchinson 1946.) 16s. The story of the Air Forces in India and Burma.

FIELD-MARSHAL VISCOUNT MONTGOMERY'S LECTURE ON "21ST (BRITISH) ARMY GROUP IN THE CAMPAIGN IN NORTH-WEST EUROPE, 1944-45."

Field-Marshal Viscount Montgomery has presented the Institution with 500 copies (in booklet form) of the lecture which he gave on 3rd October, 1945, and which appeared in the November, 1945, JOURNAL. Members or Messes who may wish to have one of these copies should make application to the Secretary.

ONE HUNDRED-AND-FIFTEENTH ANNIVERSARY MEETING

ON TUESDAY, 5TH MARCH, 1946, AT 3 P.M.

AIR CHIEF MARSHAL SIR ROBERT BROOKE-POPHAM, G.C.V.O., K.C.B., C.M.G.,
D.S.O., A.F.C. (Chairman of the Council), presiding.

THE SECRETARY, Captain E. Altham, C.B., R.N., read the notice convening the
meeting, which had been published in *The Times* on Saturday, 23rd February, 1946.

ANNUAL REPORT FOR 1945

The Council have the honour to present their Annual Report for 1945.

COUNCIL

The Council regret to record the death of their Chairman in 1939—
Admiral of the Fleet Sir Frederick Field, G.C.B., K.C.M.G.

VICE-PRESIDENTS

Admiral of the Fleet the Earl of Cork and Orrery, G.C.B., G.C.V.O.,
was elected a Vice-President of the Institution in succession to the late Admiral
Sir Reginald G. O. Tupper, G.C.B., K.B.E., C.V.O.

ELECTED MEMBERS

Admiral of the Fleet Sir John Tovey, G.C.B., K.B.E., D.S.O., was elected
to the Council in succession to the late Admiral Sir William Goodenough,
G.C.B., M.V.O.

The following Members having completed three years' service, retire:—

ROYAL MARINES

General Sir T. L. Hunton, K.C.B., T.D., D.L.

TERRITORIAL ARMY

*Brigadier J. A. Longmore, M.B.E., T.D., D.L.

INDIAN ARMY

*General Sir S. F. Muspratt, K.C.B., C.S.I., C.I.E., D.S.O.

ROYAL AIR FORCE

Air Marshal Sir Leslie Gossage, K.C.B., C.V.O., D.S.O., M.C.

AUXILIARY AIR FORCE AND ROYAL AIR FORCE VOLUNTEER RESERVE.

*Air Commodore Lord Willoughby de Broke, M.C., A.F.C.

Of the above, those marked * offer themselves for re-election, for which
they are eligible. This leaves one Royal Marine vacancy and one Royal
Air Force vacancy.

REPRESENTATIVE MEMBERS

Captain C. L. Robertson, R.N., succeeded Captain H. P. K. Oram, R.N.,
on taking up the appointment of Director of Tactical and Staff Duties.

Air Commodore N. S. Allinson, C.B., succeeded Air Commodore P.
E. Maitland, C.B., M.V.O., A.F.C., on taking up the appointment of Director
of Operational Training.

EX-OFFICIO MEMBERS

Major-General R. E. Urquhart, C.B., D.S.O., succeeded Major-General Sir James Drew, K.B.E., C.B., D.S.O., M.C., on taking up the appointment of Director-General of the Territorial Army.

Commodore A. W. S. Agar, V.C., D.S.O., accepted the invitation of the Council to become an ex-officio Member of the Council as President of the Royal Naval College, Greenwich.

Major-General P. G. S. Gregson Ellis, C.B., O.B.E., accepted the invitation of the Council to become an ex-officio Member of the Council on taking up the appointment of Commandant of the Staff College, Camberley.

Air Vice-Marshal R. Graham, C.B., C.B.E., D.S.O., D.S.C., D.F.C., accepted the invitation of the Council to become an ex-officio Member of the Council on taking up the appointment of Commandant of the Royal Air Force College, and in turn has been succeeded by Air Vice-Marshal A. P. M. Sanders, C.B., C.B.E.

HONORARY MEMBER OF THE COUNCIL

Lieut.-General E. K. Smart, D.S.O., M.C., was elected Honorary Member for Australia in succession to the late General Sir Henry G. Chauvel, G.C.M.G., K.C.B.

STAFF

It is with great regret that the Council have to report the death of Colonel E. L. Hughes, D.S.O., O.B.E., who had been Librarian of the Institution from 1927 until the Library returned to London in November, 1944. He was also Curator of the Museum from 1927 until 1940.

MEMBERSHIP

The total number of Members on the roll at the end of 1945 was 5,323, as compared with 5,220 in 1944. During the past year 345 Members joined the Institution as compared with 128 in 1944. There were 103 withdrawals as compared with 57 in 1944; 33 Life Members and 83 Annual Members died; 23 Members were struck off for being two years in arrear with their subscriptions.

The details of Members joining are as follows:—

Regular Army	...	...	...	...	...	...	136
Royal Air Force	...	...	...	...	...	...	59
Royal Navy	...	...	...	...	...	...	40
Royal Naval Volunteer Reserve	...	...	...	...	...	...	29
Royal Air Force Volunteer Reserve	...	...	...	...	...	...	23
Indian Army	...	...	...	...	...	...	16
Royal Marines	...	...	...	...	...	...	12
Territorial Army	...	...	...	...	...	...	11
Army Cadet Force	...	...	...	...	...	...	5
Royal Naval Reserve	...	...	...	...	...	...	4
Women's Auxiliary Air Force	...	...	...	...	...	...	4
Dominion Forces...	...	...	...	...	...	...	2
Women's Royal Naval Service	...	...	...	...	...	...	1
Auxiliary Air Force	...	...	...	...	...	...	1
Home Guard	...	...	...	...	...	...	1
Junior Training Corps	...	...	...	...	...	...	1

345

This gives a net increase of 103 as compared with a decrease of 102 in 1944. As the loss of some of the Life Members does not affect the financial aspect, the financial gain on the year is 133.

As might be expected, the end of the War, with the consequent retirement of many officers, has brought about a considerable number of resignations, but it is gratifying to find that well over three times as many new Members have joined. The number of Life Members—52, who joined as such during the year is an outstanding record.

FINANCE

In the Balance Sheet, the Furniture, Fixtures, Books, Maps, Charts, etc., as previously, are shown at their insured values. The valuation for insurance purposes was revised during the year and there was an increase over the previous book value of £11,790 2s. od., which has been added to the Accumulated Fund.

The surplus of income over expenditure for 1945 was £867 18s. 6d. as compared with the deficit at the end of 1944 of £304 14s. 3d.

The accumulation of funds at the Bank in the course of the year was such as to permit of the purchase out of the General Account in November, of £2,000 3 per cent. Savings Bonds 1965-75.

RECEIPTS

The following are receipts during the year which call for special comment, and comparisons with the previous year :—

			1945	1944
			£ s. d.	£ s. d.
Annual Subscriptions	...	...	5,159 6 6	4,999 4 4
Life Subscriptions	...	...	274 11 0	211 1 0
Admissions to Museum	...	...	3,784 19 6	1,317 5 3
Sales of Pamphlets	...	...	352 9 7	309 16 3
Journal Sales	...	...	964 15 10	1,034 0 3
Government Grants	...	...	975 0 0	750 0 0

ANNUAL SUBSCRIPTIONS.—The increase under this heading reflects the steady influx of new Members, which in itself is a healthy sign.

LIFE SUBSCRIPTIONS.—The exceptionally large number of new Life Subscriptions swelled the fund credited to that Account at the Bank to an extent which made it possible to invest £500 in 3 per cent. Savings Bonds. (See also under **MEMBERSHIP**.)

ADMISSIONS TO MUSEUM.—The Museum Takings for 1945 were phenomenal and easily a record in the history of the Institution ; they were £1,760 higher than the next best year (1928). (See also under **MUSEUM**.)

SALES OF PAMPHLETS.—The takings from the sales of pamphlets during the year have again been remarkable and it has been difficult to get them reprinted fast enough. The Chelsea Pensioners, acting as Attendants, have proved themselves to be most efficient salesmen.

JOURNAL SALES.—There has been a slight falling off in the sales of the Journal. With the closing down of Messes, and consequent cancelling of subscriptions, this was to be expected, but already there are indications that as the Services become stabilized the Journal is going to be in steady demand.

GOVERNMENT GRANTS.—The Air Ministry, with the sanction of the Treasury, have been good enough to approve the submission of the Council that the Grant from that Department be increased from £100 per annum to £325 per annum, thereby bringing it in line with the Grants received from the Admiralty and War Office.

EXPENDITURE

The following is a comparison of expenditure under the principal headings where comment is called for :—

		1945	1944
		£ s. d.	£ s. d.
Wages and National Insurance	...	2,185 1 6	1,808 14 6
Journal Printing	...	2,707 8 0	2,293 6 7
Lighting	...	395 3 1	272 11 6
Valuing of Furniture	...	52 10 0	—
Contribution to Staff Pension Scheme	...	323 18 11	127 11 1
Transfer to Discretionary Fund	...	750 0 0	—

WAGES AND NATIONAL INSURANCE.—The Council having reviewed the scales of wages paid to the Attendants and Cleaners in the light of present-day living conditions, decided that these should be substantially improved. This and the recruitment of normal staff have increased expenditure under this heading.

JOURNAL PRINTING.—With the increase of 10 per cent. in the paper allowance, it has been possible to produce a somewhat larger Journal. It has also been necessary to order more copies to supply the increased number of new Members.

LIGHTING.—The Museum having been open for the full year, and the Theatre and Library having been taken into normal use again, there has been an inevitable increase in the charge for lighting.

VALUING OF FURNITURE, ETC.—The Council considered it expedient to have an expert inventory and valuation made of the Furniture and Fittings in the Institution, and it was found that, under existing conditions, these were undervalued.

It was also decided to increase the value of the Books in the Library for insurance purposes. (See Balance Sheet).

CONTRIBUTIONS TO STAFF PENSION SCHEME.—The Council decided that compensation should be paid to certain members of the staff who had remained in the Institution's service throughout the War towards their annual payments for their Superannuation and Life Insurance Policies, thereby bringing them more into line with Members of the Staff whose payments had been made by the Institution while they were called up.

DISCRETIONARY FUND.—On the recommendation of the Finance Committee, the Council have reviewed their Standing Order—Chapter II, para. 7, which lays down that no allowances or gratuities other than those derived from the Institution's superannuation policies will be granted to retiring members of the Staff. In view of the change in conditions since this was drawn up in 1929, they feel that occasions may arise when they will wish to compensate an officer of the Institution for the loss of office when they think he should retire.

After consulting the Auditors, the Council have decided to institute a Discretionary Fund to which contributions can be made annually as they deem to be appropriate after receiving the Annual Statement of Account, with a view to meeting that contingency. They are allocating £750 as an initial contribution to this Fund from 1945 Revenue.

COVENANTED SUBSCRIPTIONS

Every Member has been notified of the Scheme for Covenanted Annual or Life subscriptions, whereby the Institution, under the Income Tax Act 1918, Section 37, can recover tax on these subscriptions at the full current rate.

There has been a most gratifying response to the Scheme, and 449 Annual and 56 Life Members had signed the requisite Deed up to the end of 1945.

GENERAL REMARKS

The year 1945 has been extraordinarily successful from the financial point of view. It is, however, important to realize that exceptional expenditure will have to be incurred, when labour and materials are available, to recondition the Institution, especially the Museum, so as to make good the effects of the War (quite apart from those caused by enemy action) and to bring it up to modern requirements in every way.

JOURNAL

With the termination of the War, the Journal is benefiting by lectures and articles from high commanders and other officers giving first-hand accounts of their conduct of operations and personal experiences. The value of these for professional study and as historical records is inestimable.

With the lifting of censorship, it has also been possible for the Institution's publication to resume its time-honoured role of giving expression to views, not necessarily orthodox, but which point lessons gained on active service and may be of assistance to those responsible for framing future policy. Contributions of this character are welcome, subject, of course, to due regard having been paid to the requirements of discipline and security.

On the completion of the War Diary in the November, 1945 number, the Journal Committee desire to express their indebtedness to Captain W. Miles for compiling it with such care ever since it was started in November, 1939. The space which becomes available on the termination of this special feature is being allocated to additional articles, the reintroduction of the International Situation Section, and Foreign Naval, Army and Air Notes.

LIBRARY

With the return of the Library to London, increasing use is being made of it by Members.

The Institution is still indebted to Mr. T. Hitch for his voluntary services in checking every volume in the shelves. The staff has been increased by the appointment of an Assistant Library clerk.

During the year, 1,250 books were issued on loan, the greatest demand being for the newer books.

232 volumes were added to the Library during the year; of these 95 were on general subjects, 24 naval, 70 military, 43 air. Some of these were personal notebooks, MSS. and privately circulated editions, which are not sent out on loan. In addition, 104 Home Guard Histories have been received. These vary from some quite pretentious editions to simple Roneo-ed typescripts.

MUSEUM

The Royal United Service Museum has never been so popular as it was during this Victory year. In 1945, 56,528 members of H.M. and Allied forces passed the turnstile; free admittance was also given to 320 from schools, etc.; 75,559 of the general public paid the usual charge of one shilling each. This means that since the Museum was re-opened in March, 1944, it has been visited by a total of over 241,000 persons—a striking tribute to interest in the Services, and also to the attraction of the exhibits and the way they are displayed.

The return of the Library made it essential that the Theatre should be restored to its normal state in time for the Winter lecture session, therefore relics, models, etc., associated with the late war, which had been on show there, were transferred to such parts of the Crypt as it has been possible to re-open.

The full re-opening of the Museum awaits the replacement of windows and other work to be carried out in the Banqueting House by the Ministry of Works.

The Institution is indebted to Field-Marshal the Hon. Sir Harold Alexander, Sir Bernard Montgomery, Air Chief Marshal Lord Dowding, Air Chief Marshal Sir Arthur Harris, for personal relics, and to Captain E. Condor, R.N., Captain E. W. Swan, R.N.V.R., Air Vice-Marshal Lloyd, Group Captain G. Thripp, the Officer Commanding and Officers of the 8th Royal Irish Hussars, and other officers for relics and mementoes of the late war. Further valuable and historically interesting gifts have also been received during the year, of which the more important have been detailed in the Secretary's Notes in the Journal.

In order to find room for such new accessions, the Museum Committee is making a detailed review of the whole of the catalogued exhibits with the object of eliminating those which are redundant, duplicated, or not really suitable for the Royal United Service Museum. Other Service Museums, including Regimental Museums, are being given the first offer of any articles which may seem suitable for them before they are otherwise disposed of.

UNIFORMS COMMITTEE

The Committee which before the War was working on the compilation of a Summary of Uniforms, Colours, Standards, etc., of the Army, has been reformed.

At the invitation of the Council, Lieutenant-General Sir Charles Loyd, K.C.B., D.S.O., M.C., has succeeded General Sir Robert Whigham, G.C.B., K.C.M.G., D.S.O., who had resigned from the Committee. General Loyd has been elected Chairman of the Committee.

Letters have been addressed to all Colonels of Regiments of the British and Indian Army notifying them of the resumption of this work and asking them to arrange for Regimental Representatives to serve as Associate Members of the Committee.

Captain Donald Anderson has resumed the work of editing the compilation of the Summary.

Any correspondence on this subject should be addressed to Major P. D. Clendenin, Hon. Secretary of the Uniforms Committee, at the Royal United Service Institution.

ROYAL UNITED SERVICE INSTITUTION
BALANCE SHEET, 31ST DECEMBER, 1945

DR.

CR.

		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
	To ACCUMULATED FUND—						
	Excess of Assets over Liabilities, as at 31st December, 1944	... 111,405 0 9	... 111,405 0 9	23,101 16 8	By LEASEHOLD BUILDING, Whitehall, S.W.1.		
	Add: Additions to Museum Exhibits during the year, per contra	568 2 0		" FURNITURE, FIXTURES, FITTINGS, BOOKS, MAPS, CHARTS, etc. (as valued for Insurance at 4th July, 1945)		23,101 16 8	
	Less : Withdrawals per contra	... 162 0 0		Furniture, Fixtures and Fittings	... 7,019 3 6		
	Add : Increase in book value of Furniture, Fixtures, Fittings, Books, Maps, Charts, etc. on revaluation for insurance	111,861 11 9		Books, Maps, Charts, etc.	... 15,000 0	22,010 2 6	
	Add : Appreciation of Investments since 31st December, 1944	... 11,750 2 0					
	Add : Revenue Account—Surplus per annexed Account	123,641 13 0		" MUSEUM EXHIBITS, etc. (excluding LOAN Collection) as valued for Insurance—			
				As at 31st December, 1944	... 59,376 15 0		
				Additions during the year	... 558 2 0		
				Defect : Withdrawals during the year...	... 59,394 17 0		
				Note : The Loan Collection is covered by Insurance for £10,480 6s. 0d.	... 162 0	59,779 17 0	
				" LEASEHOLD REDEMPTION FUND—			
				Premiums paid to 31st December, 1944, on Insurance Policies for £23,100, expiring October, 1972	... 4,326 0 11		
				Add : Premiums paid during the year	... 66 3 7	4,391 4 6	
				" LIFE SUBSCRIPTION FUND—			
				£1,900 1% Savings Bond, 1965-75, at market price, 31st December, 1945	... 1,900 0 0		
				Cash at Bank on Deposit Account	... 392 0 4	2,329 0 4	
				" INVESTMENTS AT MARKET PRICE, 31st DECEMBER, 1945—			
				£14,859 16s. 8d. 3% Funding Loan, 1969-69	... 14,765 1 4		
				£1,000 1% Defence Bonds 1960-70	... 1,000 0 0		
				£1,500 1% Savings Bonds 1960-70	... 2,531 5 0		
				£1,000 1% Savings Bonds 1965-75	... 2,000 0 0	30,266 6 4	
						893 10 8	
						1,329 17 7	
						£134,099 16 7	
	BERTRAM ABEL SMITH, Chairman, Finance Committee						
	E. ALTHAM, Secretary						
		£134,099 16 8					
		119,120 16 8					

TO THE MEMBERS OF THE ROYAL UNITED SERVICE INSTITUTION,
such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the Institution and the explanations given to us and as shown by the books of the Institution.

BARTON, MAYHEW & CO.,
Chartered Accountants,
ALDEMAR'S HOUSE,
BIRHOSKATE, LONDON, E.C.2.
15th February, 1946.

Advertiser.

HUNDRED-AND-FIFTEENTH ANNIVERSARY MEETING

1944		1944	
£ s. d.	£ s. d.	£ s. d.	£ s. d.
2,612 1 0	To Salaries	2,639 3 10	4,999 4 4
1,898 14 6	" Wages and National Insurance	2,165 1 6	By Members' Subscriptions Received
10 7	" Attendants' Clothing	13 4 8	" Income Tax Refund on Subscriptions under
138 10 0	" Pensions and War Gratuities	139 0 0	" Deed of Covenant
2,935 9 9	" Museum Repairs, and Sundries	2,707 8 0	4 11 0
2,935 6 7	" Journal Printing	293 1 7	" Voluntary Extra Subscriptions
240 1 2	" Journal Postage	187 6 7	" Life Subscriptions:—
178 14 6	" Literary Services	187 6 7	211 1 0
29 3	" Shortland Notes	61 18 4	Amount brought to Credit
68 17 11	Library Purchase and Binding of Books	93 1 7	274 11 0
63 11 11	Periodicals and Newspapers	69 3 7	5,441 8 6
2 10	" Advertising	159 4 3	3,784 19 6
880 0	Ground Rent	5 5 0	352 9 7
87 9	Water Rate	580 0 0	4,137 9 1
145 3 0	Insurance	87 1 6	1,084 0 3
149 8 9	Fuel	163 12 5	" Sales of Journal
272 11 6	Lighting	826 18 10	484 3 0
88 16 0	General Repairs	152 4 11	" Advertisements in Journal
23 0	Restoration of Pictures	596 3 1	1 0 0
63 1	House Expenses and Sundries	99 3 1	" Sales of War Diary, Volume I
62 10 0	Audit Fee, 1946, and Professional Charges	108 17 11	309 16 3
58 10 0	Postages, Telegrams, etc.	755 8 0	" Sales of Catalogues and Pamphlets
129 7 6	Printing and Stationery	73 10 0	30 16 3
54 1 9	Telephone	89 19 11	" Profit on Repairing Regimental Colours, etc.
—	Fee for Valuing and Preparing Inventory of	233 16 10	11 6 0
—	Furniture, and Fixtures	68 2 7	" Miscellaneous Receipts
—	Revising "Waterloo" Booklet	52 10 0	704 13 6
127 11 1	Travelling Expenses	10 10 0	Dividends and Interest Received
66 3 1	Contributions to Staff Pension Scheme	518 8 4	70 9 0
666 14 1	Leasehold Redemption Fund	323 18 11	" Government Grants
25 9 5	Library Evacuation and Return Expenses	3 2 9	—
—	Contributions and Premiums under War	66 3 7	" Cost of repairing damage to Fixtures and
—	Damages Acts	—	" Fittings due to Enemy Action Refunded
—	Transfer to Discretionary Fund	21 14 5	—
—	" Balance, being Surplus for the Year carried to	750 0	304 14 3
—	Balance Sheet	867 18 6	" Balance for the Year, carried to Balance Sheet
£10,062 6 1		£12,600 11 6	
£10,062 6 1		£12,600 11 6	

THE CHAIRMAN'S ADDRESS

Just about a year ago, my predecessor Sir Walter Kirke, in addressing you expressed the hope that when my turn came to preside over the Anniversary Meeting it would be in a more peaceful atmosphere. That optimism has been justified by events. He went on to say "the Institution is weathering the War very successfully," and to-day we can congratulate ourselves that it has weathered the War safely.

With reference to that, I think that all the Members of the Royal United Service Institution, and in fact everybody in the three Services, have good cause to be grateful to the Council of six years ago and to the Secretary—I was not on the Council then, so that I can say this quite freely—grateful to them for their foresight in arranging for the safe custody of the books of the Library and all the removable Museum pieces. Those precautions were fully considered before the War commenced, down to such details as emergency transport; in fact arrangements were made that if road transport became impossible there would be a river steamer available, which could be loaded up rapidly and proceed upstream. As a result of this careful fore-thought the movement both away from London and now back again was carried out deliberately and systematically and with practically no loss or damage. Had that foresight not been exercised, there might well have been a panic rush in the Autumn of 1940, confusion and loss would have occurred, and we should not have had the Library and Museum in the good condition that they are to-day.

A falling-off of membership was, of course, inevitable under war conditions; the remarkable thing is that it has not been greater. For that the Institution has to thank all its Members, and particularly those who were prisoners of war for continuing to pay their subscriptions although they may have obtained little or no benefit from them. We have tried to make up to them for this to some small extent by storing their copies of the JOURNAL until they could be delivered to them. It is gratifying to know that many returning Members have expressed their thanks to the Institution for keeping the JOURNAL going during the War years, and have said how valuable it is in enabling them to keep abreast of what has happened while they have been away from events and, perhaps, out of touch with them altogether.

We have had a very successful Victory Year, as you will see from the Annual Report, especially as regards the popularity of the Museum. The monthly receipts of the Museum from visitors who have paid for admittance have broken all previous records and, as you know, everyone in uniform is admitted free. There will undoubtedly be a falling off of public interest in military affairs (using the word "military" in the widest sense), and the Museum receipts have in fact already dropped considerably. That is an inevitable aftermath of the War. On the other hand, we may hope for a steadily increasing membership, because officers who are remaining in the Services will now have more leisure to study their profession, while many of those who are leaving will find in the Institution exceptional opportunities to keep in touch with their Service interests and associations.

Perhaps the most important role that the Royal United Service Institution can play in the years of peace, which we hope lie before us, is that of assisting each Service to a better understanding of the other two. Within the last few months we have been honoured by all the three Chiefs of Staff either taking the Chair at a Lecture or actually giving one; each in turn has remarked on the vital importance of maintaining those close and cordial relations between the Services which played such a great part in bringing us victory, but which are so much more difficult to preserve under peace-time conditions. All three also emphasised that the Royal United Service Institution could and must do a great deal to retain and develop these relations, and to bring officers of all three Services together.

The first step towards this, of course, is to make the Institution and the advantages of membership better known in the Services themselves. With that object I have lately written to all Commanders-in-Chief and Commanding Officers of

certain of the larger Establishments asking them to appoint liaison officers ; the response has been most gratifying. The liaison officers perform a dual role ; not only do they make the Institution better known, but they also enable the Council to know how the Institution can be of more value to the Services, and particularly to junior officers. The Secretary has presided at meetings of these liaison officers from the Home Commands ; their enthusiasm and desire to help have been most marked, and have already taken active shape in the way of concrete suggestions. I feel sure that good results must come from such direct links and personal contacts.

The Annual Report is in your hands and you will see that the membership during 1945 was well on the up-grade. In this connection, I should like to draw your special attention to the scheme for Covenanted Subscriptions, details of which have been sent to every Member. What it means is that with very little trouble and no extra expense to themselves, Members who will sign the appropriate Deed covenanting to pay their subscription for a period of seven years, will enable the Institution to recover income tax on their annual subscription at the full rate. Up to date 585 Members have adopted this scheme and I hope that before the end of this year my successor will be able to say that the number has been more than doubled.

It will be convenient to take each section of the Report in turn. The first part deals with Finance, and I will therefore call on Colonel Abel Smith—the Chairman of the Finance Committee, for his remarks, and he will answer any questions which may be put to him on the subject.

COLONEL B. ABEL SMITH : It requires very few words from me to refer to the finances of the Institution during the past year, for, as usual, the Secretary has presented them to you in a very full manner. I should, however, like to remind you that last year when I spoke to you I had to admit that we had had a deficit but, taking the whole War through, we have done extraordinarily well, and we have ended the War with more money than we started with, which I think you will agree is most satisfactory.

Last year we had a bumper year, quite extraordinarily good, for reasons which the Chairman has already mentioned ; and we have taken the opportunity to form what we call a Discretionary Fund. We had an insurance arrangement by which our staff could retire at the age of 60 and get certain benefits, but we have some older members of it who are still with us, and who I hope will remain with us for some time as they are so efficient, and we were rather worried that when their time came to retire there would be nothing for them. We have therefore taken the opportunity of this bumper year to set aside £750, which I hope we shall be able to increase each year to a certain extent so as to have a fund which will take care of those older people.

With regard to the future, we cannot possibly expect to do so well this year. During the War we had to work with a skeleton staff, but now I am glad to say that we have a full staff, for without a full staff in peace-time this place could not be run efficiently. Not only have we to pay a full staff, but we have to pay them higher wages than ever before, and therefore our expenses will certainly go up very rapidly. On the other hand, as the Chairman has already said, it is unlikely that the Museum will do as well as it has done during the past year. I hope, however, that in spite of this we shall be able to make both ends meet in the coming year.

THE CHAIRMAN : Are there any questions on Finance ? (*No questions were asked*).

Then we come to the JOURNAL and Library. I do not think there are any points there, but are there any questions on that section of the Report ? (*No questions were asked*).

Are there any questions on the Museum section ? (*No questions were asked*).

If there are no questions I now formally move :

“ That the Report and Accounts, as circulated, be taken as read and adopted.”

COLONEL ABEL SMITH (Chairman of the Finance Committee) seconded the Resolution, which was carried unanimously.

RE-ELECTION OF AUDITORS

LIEUTENANT-COLONEL R. G. CURREY : I beg to move :

“ That Messrs. Barton, Mayhew & Company be re-elected Auditors for the ensuing year.”

MAJOR P. D. CLENDENIN seconded the Resolution, which was carried unanimously.

AMENDMENT TO BYE-LAW

GENERAL SIR WALTER M. ST. G. KIRKE, G.C.B., C.M.G., D.S.O. : I beg to move :

“ That the following amendment to Bye-Law, Chapter III, paragraph 4, which has been duly posted in the Reading Room, be adopted :—

Composition of Council

“ The Vice-Presidents shall consist of two Naval, four Military and two Air Force officers . . . ”

The policy of the Council has been, as you know, to extend the privileges of the Institution to the Royal Air Force on the same lines as to the more senior Services, as and when opportunities occurred. It has been brought to their notice that, with regard to Vice-Presidents, the situation is that the Navy has two, the Army has four and the Royal Air Force only one. I have therefore much pleasure in proposing that the number of Vice-Presidents of the Royal Air Force be increased from one to two.

ADMIRAL SIR CHARLES J. C. LITTLE, G.C.B., G.B.E. : I have much pleasure in seconding the proposal put forward by General Sir Walter Kirke, for the reasons that he has given us.

The Resolution was carried unanimously.

VACANCIES ON THE COUNCIL

THE CHAIRMAN : If you will look at the agenda you will see that there are certain vacancies on the Council and that certain officers have been nominated to fill those vacancies. Unless anyone has any views to the contrary, I should like the Meeting to vote on those nominations *en bloc* instead of individually.

ROYAL NAVY (1 vacancy)

Rear-Admiral G. E. Creasy, C.B., C.B.E., D.S.O., M.V.O.

ROYAL MARINES (1 vacancy)

Brigadier R. A. D. Brooks, C.M.G., D.S.O., A.D.C., R.M.

ROYAL NAVAL VOLUNTEER RESERVE (1 vacancy)

Captain T. D. Manning, V.D., R.N.V.R.

TERRITORIAL ARMY (1 vacancy)

Brigadier J. A. Longmore, M.B.E., T.D., D.L.

INDIAN ARMY (1 vacancy)

General Sir S. F. Muspratt, K.C.B., C.S.I., C.I.E., D.S.O.

ROYAL AIR FORCE (1 vacancy)

Air Vice-Marshal Sir J. M. Robb, K.B.E., C.B., D.S.O., D.F.C., A.F.C.

AUXILIARY AIR FORCE AND ROYAL AIR FORCE VOLUNTEER RESERVE (1 vacancy)

Air Commodore Lord Willoughby de Broke, M.C., A.F.C.

These nominees were unanimously elected.

THE TRENCH GASCOIGNE PRIZE ESSAY COMPETITION, 1945

THE SECRETARY : I have to report the result of the Trench Gascoigne Prize Essay Competition for 1945. There were only three competitors. The Council, having received the reports of the Referees, did not consider that any one of the essays was up to the standard for the award of the full First Prize, but they have awarded a consolation prize of ten guineas to Lieutenant-Colonel R. H. Hall.

VOTE OF THANKS TO THE CHAIRMAN

ADMIRAL SIR CHARLES J. C. LITTLE, G.C.B., G.B.E. : It is my privilege to move the next Resolution :

" That the thanks of the Institution be accorded to the Chairman, Sir Robert Brooke-Popham."

In doing that, I should like to say just two things. We recognise, of course, that 1945 has been a very exceptional year in this Country owing to our great victories first in the West and then in the East, and has led to tremendous additional light being thrown onto the Services ; for that reason the Institution, as the Chairman has already pointed out to you and as is described in the Annual Report, has benefited very much. But we have to thank him for taking full advantage of this wonderful year during which he has been Chairman of the Council.

First of all there is this scheme for liaison officers with the principal Home Commands of the three Services. I do not know whether you will agree with me when I say that the Royal United Service Institution, like other institutions of this kind, is by nature a conservative institution, and this scheme for liaison officers, in addition to other things, is an important event in his year of office. It is, I am sure, going to be of great benefit to the Institution, because we cannot rely for our receipts on the public coming to the Museum ; we must rely on the Members themselves. It is therefore most important to keep up the membership, and Sir Robert has taken a very important step, which has already borne fruit, as will be seen from the long list of new Members in the Secretary's Notes in the latest number of the JOURNAL.

The second thing is the scheme for covenanted subscriptions. Although, I believe, Sir Robert did not propose it himself, he has seen it through and that, too, seems to me to mark this year as a successful one for the Institution.

I should like to add to this Resolution, without suggesting that we should change the form of it, that we not only give our thanks to Sir Robert for the great care that he has taken of the Institution during his year of office but also congratulate him on the fine result he has achieved. Many of my colleagues on the Council are here and I feel that we as a Council, apart from the Members of the Institution generally, would like also to thank Sir Robert for the great patience he has shown and the tender care he has taken of all of us at our meetings. (*Applause*).

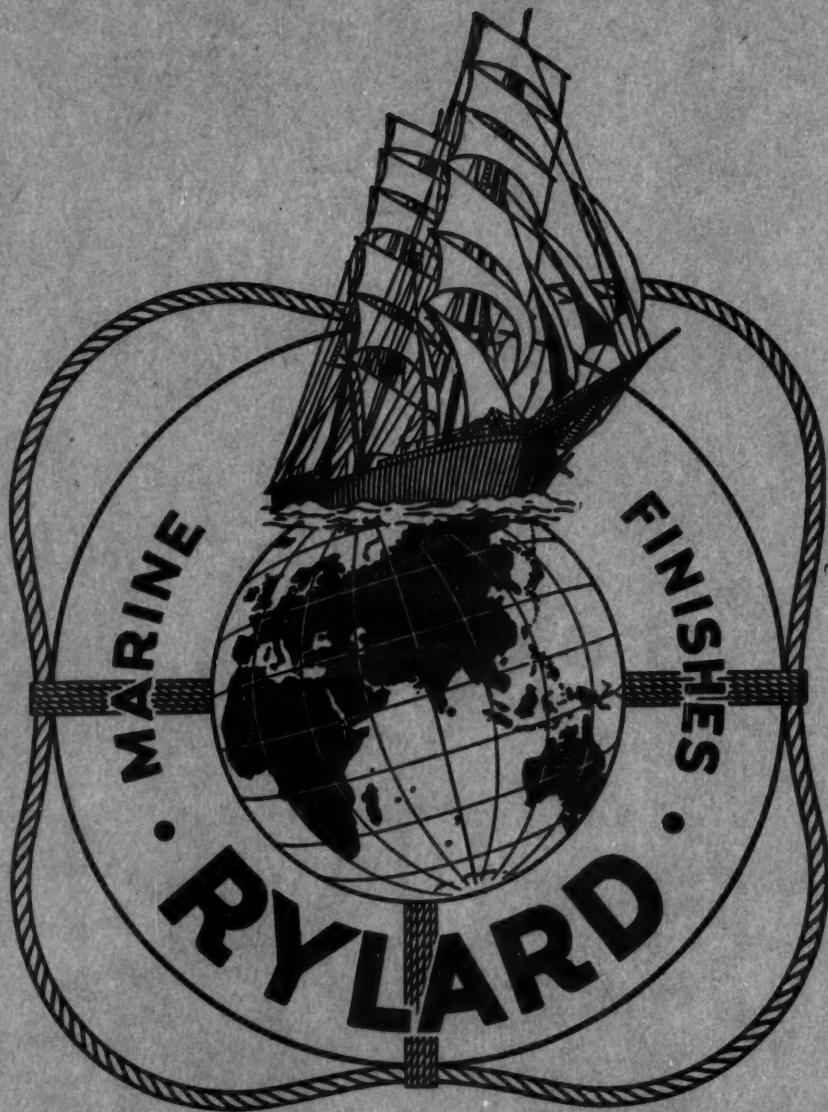
GENERAL SIR RONALD ADAM, Bart., G.C.B., D.S.O., O.B.E. : I should like to congratulate the Chairman and to second the Resolution.

The Resolution was carried unanimously by acclamation.

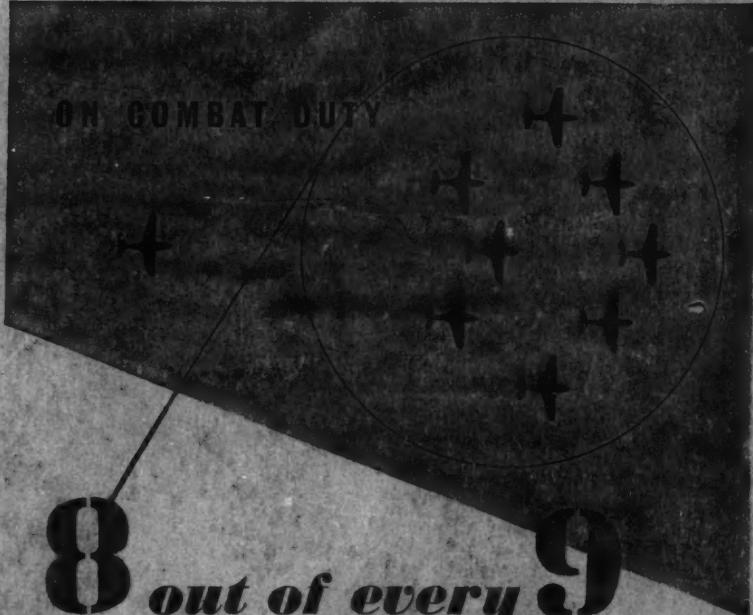
THE CHAIRMAN : I feel quite overwhelmed by the very kind tribute that Admiral Sir Charles Little has paid me. I will take this opportunity to say, not in any way formally, but in all sincerity, that this Institution owes a great debt to its staff. Starting with Captain Altham, as its head, I will pay a tribute to the tremendous drive, initiative and enthusiasm that he shows in every bit of his work. (*Applause*). These characteristics permeate automatically down from the head of any organization, but we are also very fortunate in having men and women with the capacity to follow that example and to reflect the energy and keenness radiated from the top. We are extremely lucky in our Secretary and in the whole of our staff. (*Applause*).

That concludes the Hundred-and-Fifteenth Anniversary Meeting.





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